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CONTENTS

		Page
THE PUBLIC-SCHOOL TEACHER AS A RESEARCH WORKER	B. R. Buckingham	235
ABILITY GROUPING OF JUNIOR HIGH-SCHOOL PUPILS IN CLEVELAND: SOME PRACTICAL ASPECTS OF THE PROBLEM	Frank G. Pickell	244
A TECHNIQUE FOR INVESTIGATIONS IN CLASSROOM METHOD	Douglas Waples	254
A GROUP INTELLIGENCE EXAMINATION WITHOUT PREPARED BLANKS	J. Crosby Chapman	269
COMPARATIVE COSTS OF PLATOON AND NON-PLATOON SCHOOL ORGANIZATIONS	Charles L. Spain	280
READING DIFFICULTIES IN ARITHMETICAL COMPUTATION	W. E. Lessenger	287
EDITORIALS		292
REVIEWS AND ABSTRACTS		294
NEWS ITEMS AND COMMUNICATIONS		303

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JOURNAL *of* EDUCATIONAL RESEARCH

Volume XI APRIL, 1925 Number 4

THE PUBLIC-SCHOOL TEACHER AS A RESEARCH WORKER

B. R. BUCKINGHAM
Ohio State University

In this paper I desire to make two points: The first is, that the educational world needs the teacher as a research worker; the second is, that the teacher and the teacher's calling will be benefited by research work. A recent interest in the question of learning in relation to teaching method has led me to believe that a great deal of experimentation on learning questions is educationally ineffective because it is conducted under artificial conditions and restrictions. Somebody found in a psychology laboratory that certain striking facts were secured by the administering of praise and blame during the learning of nonsense syllables by adults. If the experimenter says to the subject—you know the learners are subjects in the laboratory—"You did that splendidly," or "I don't know that I ever saw that done better," or "How *do* you learn so rapidly?" the subject so expands and warms to his labor that he produces 70 or 80 percent better results than he or another of the same ability produces if the experimenter says to him something like this: "You ought to be ashamed of that," or "A child of six could do better than that," or "That is the worst record I have ever seen."

The result of this laboratory investigation is to throw into high relief the notion that pleasurable emotional tone is of great value in learning. It would, however, be much more significant for purposes of education if this work of the psychologist were followed up by the teacher in a classroom situation. The psychologist is the pioneer and no one in his senses will belittle his

labors. But with reference to education they are incomplete. They have no sufficient application. What is done with adults and with nonsense syllables may or may not work out with children and with the mutiplication table or a lesson in history. Suppose some teacher were to try out under reasonably controlled conditions the effect of praise. Would not the report of such an investigation even if it were worked out in a single classroom be gladly received by a reputable educational journal? If you are inclined to desire data on more children than are to be found in a single classroom, you should remember that as many as thirty or forty subjects in a psychology laboratory are by no means common. Moreover, there is no reason why teachers' research work should not be organized so that several classrooms may participate in the same project.

Consider also the investigations made by various psychologists on periods of practice. You will remember that Starch, for example, showed that when university students learned to write numbers for letters according to a code, and when the learning time of 120 minutes was divided into ten-minute periods, twenty-minute periods, forty-minute periods, and one period of 120 minutes, the greatest amount of learning was done in the shortest periods. This is indeed significant. If it will work in the classroom it is an important fact to know. Whether it will work with children as well as with university students and whether meaningful material may be substituted for nonsense material is a question on which the psychologist in his laboratory throws no sufficient light. No one can do this better than the teacher. Even if the graduate student goes out into the schools as Kirby did and gathers real data on this topic, or even if the school superintendent does this, it is the teacher who works the method and gathers the results at first hand. Why should not the teacher assume more responsibility? If short and frequent periods pay big dividends in learning the arithmetic combinations, or in adding columns of figures, or in acquiring a vocabulary in reading or in a foreign language, then the whole question of program making and of classroom technique is thrown wide

open for research. Who can give us light on this better than the teacher?

Moreover, on this very question of the best length of practice period, each teacher and each corresponding class afford conditions sufficiently peculiar to require immediate and searching investigation on the spot. The best length of period differs among children of different grades and among children who are studying different subjects. The type of learning required—whether it be verbal as in learning a foreign language, manual as in wood work, or logical as in history—will also have a bearing on the question. Moreover, even in the same class pursuing the same kind of work, the individual differences among pupils will be considerable. To the teacher, therefore, I say, let no one persuade you that your opportunities for study and investigation are small. Do not suppose that educational research is appropriate only for the university professor or for those who belong to bureaus of research.

Then there is the big question of the part and whole methods of learning. I believe this question will not be settled right until the teachers come to the rescue. It is by no means simple. The general weight of evidence is in favor of the whole method. But the kind of material learned, the length of the material, its uniformity of difficulty, the length of retention required, and the individuality of the learner all enter as modifying conditions. It seems clear that a mixed method—which has, however, more elements of the whole than of the part method—is better than either of these two extreme methods. What we need in order to come to grips with the question on the level at which it must be applied is the service of teachers working with pupils in the school. The psychologists have spent much time dealing with nonsense syllables, digits, and arbitrary symbols. I should be the last to deprecate this. There are real reasons for experimentation on material which is devoid of meaning. It gets at the dead lift of memory, as it were. But all of these reasons have reference to such experimentation as a point of departure; and to remain on this level of memory material is to be forever beginning and forever failing to attack the real problem. Logical memory and

the apprehension of meanings—these are especially emphasized in the modern school. I, therefore, agree with Kuhlman and with Pyle and Snyder who quote him, that more practical results will be obtained when the investigations of memory involve learning and memory processes as they are found in the schools and in life.

Some of the experiments reported in the psychological journals are of such a kind that they could have been performed equally well by teachers in the classroom. For example, in *L'Année Psychologique* a rather pretentious account lately appeared of the kind of repetition that should be adopted in order to secure the greatest economy of time. A group of adult learners was given in laboratory surroundings stanzas of poetry to learn. They were left to their own devices, and all of them proceeded to divide the learning task into small pieces each of which they learned separately. In other words, they used the part method. A clever device was used for recording the repetitions of the learners, whether these repetitions consisted of whole stanzas or of particular lines. The published report indicated in an interesting manner that there were individual patterns of procedure peculiar to each learner. Although all the subjects used the part method, each one used it in an arrangement peculiar to himself. Apparently also just as they had fallen into the part method—a method really uneconomical for the work in hand—so they had fallen into various extremes of this method, the most extreme being the least advantageous.

The point I am getting at, however, is not the outcome of this experiment but the fact that it appropriately belongs to the school. If you substitute the teacher for the psychologist, the schoolroom for the laboratory, and a class of pupils for the half-dozen learners, you have the conditions for a very much more fundamental and satisfactory experiment than the one to which I have just called your attention.

Here is another published experiment which might better be performed by the teacher. Professor Norsworthy had 83 students learn a German-English vocabulary. A record was taken of the time required by each student to learn the vocabulary to the point where he could give all the German words when the Eng-

lish words were presented. Naturally this time varied considerably. The whole matter was then put aside for thirty days without giving the students any idea that it would be referred to again. At the end of this time each student was tested on the vocabulary he had learned. Among other things, it was found that the most rapid learners remembered the greatest number of words after the thirty-day period. Students in educational psychology, many of whom have no doubt heard the expression "Easy come easy go," will find in this experiment a vivid verification of the contrary belief—namely, that those who learn rapidly retain well.

But there are many ramifications of this simple idea. Again the kind of material to be learned plays a part. Very likely the period of retention does so too, and certainly the individuality of the learners is an important item. The experiment as Professor Norsworthy has given it is entirely appropriate for a teacher of German in the high school to carry out. Moreover, teachers of other subjects may by this simple method find out to what extent retention is related to ease of learning in their subject. Then finally each teacher in his or her classroom can find out on the basis of real evidence what the individual differences are in respect to this important learning problem. The fact that such an experiment was performed by a psychologist and reported in a psychological journal does not thereby make it a problem which belongs solely to the psychologist. The question itself—the question whether rapid learning is well retained—although interesting, is completely over-shadowed by a problem which these data suggest but which Professor Norsworthy as a psychologist had no means of undertaking. She found and noted the great variation in rate of learning and in degree of retention among these 83 students; and a similar variation would undoubtedly be found by any public-school teacher who performed the same experiment. A more important problem, however, is an analysis of the methods by which the superior learners attain their results, and the teaching of these methods—as far as they may be taught—to inferior learners. In other words, it is the follow-up of these findings which will yield the greatest returns.

It is just at this point that the teacher as an experimenter has greater opportunities than the psychologist. The latter cannot ordinarily command the services of a large number of learners. And even if, as in the case of Professor Norsworthy, a relatively large number may be secured they cannot be secured for a long period of time. Moreover, even if the conditions were entirely favorable for the psychologist, nevertheless the problem when pursued by him is always relatively theoretical and remote. And it should be. If the story were mine to tell I should dwell with conviction upon the value of both the theory and the remoteness for some types of psychological investigation. But the time comes when the same problems should be pursued in their practical and immediate bearing. These problems in these bearings can never, in my judgment, be pursued by anyone as successfully as by the teacher. This seems to me to be true for this reason if for no other: In the case of the teacher the application may be made to the very persons from whom the data were secured and in respect to whom, therefore, the validity of the data is least doubtful.

Teachers are no doubt prepared to believe that they may possibly investigate questions about reading and arithmetic, science and modern languages, but they may not be prepared to believe that in matters so "pure" and rarified as questions of learning they can do anything worth while. It is for this reason that I have in this paper given attention to problems of learning. If we consider the teaching subjects, we find the opportunities for the teacher as an investigator still more numerous. Let us consider arithmetic for the moment. And let us narrow the range of our attention to arithmetic as taught in the earliest grades. Here are some of the questions which we should like to have answered; and in answering them it is the teacher who must do the work. (1) Should addition and subtraction combinations be taught together or separately? Should one teach 8 less 5 are 3 along with 5 and 3 are 8, or should one finish the addition combinations before beginning the subtraction combinations? (2) To what extent may transfer of learning to higher decade addition and subtraction be relied upon? To what extent,

in other words, may we expect the learning of 5 and 3 are 8 to guarantee a knowledge that 15 and 3 are 18, 55 and 3 are 58, etc.? And to what extent do we have to teach specifically 15 and 3 are 18, and 55 and 3 are 58? (3) What methods of teaching the addition combinations will best serve to prevent counting on the part of the pupil as a means of getting the answer? (4) Should the combinations be taught in regular order—that is, beginning with the ones, then taking the twos, etc.—or should a broken order be used? (5) If a broken order is used, to what extent is the difficulty of the various combinations (which we now know pretty well) a proper criterion for determining the order? (6) To what extent in determining the order of teaching should combinations be kept apart which have a common element? For example, should $5+4$ and $3+4$ be kept apart on account of the common item 4? Should $3+7$ and $6+4$ be kept apart on account of the common item 10? (7) Much has been written lately about the distribution and lack of distribution in textbooks of opportunity to practice the different combinations. What superiority, measured by results, is attained when pupils are given practice material evenly distributed over all the combinations? What is the effect when the amount of practice is more frequent on the more difficult combinations? (8) How should drill be distributed in point of time? One may distinguish four or five types of distribution and test each by the results attained. (9) How serious is an error made in giving a combination—seriousness being measured by the number of times the error afterwards comes up? (10) Myers is in apparent opposition to Thorndike on the question of wording verbal problems. Myers pleads for what he calls imaginative problems and in setting them up he uses many words. Thorndike on the other hand would make the problems contain as few words as are consistent with clear statement. On which type of problem do children do better? Perhaps we have in this connection the emergence of an idea of literary taste in the writing of verbal problems. Perhaps various styles will emerge as they have in poetry—something like (to paraphrase Bagehot) Thorn-

dike, Myers, and X or pure, ornate, and grotesque art in English problems.

I said in the beginning that I wanted to make two points. I have addressed myself to the first, namely, the fact that the educational world needs the teacher as a research worker. I have tried to show that we need a different type of production and a vastly greater amount of production than the existing research facilities permit us reasonably to expect. I should now like to revert briefly to the second point—namely, that the teacher and the teacher's calling will be benefited by research work. Indeed, if I am not mistaken, almost, if not quite the greatest benefit which we may expect to come from the teacher as a research worker will be the benefit to himself. The object in teaching educational psychology in teacher-training institutions is to acquaint teachers—to put the thing in popular phrase—with the way the mind works. It is believed that they will be more competent as teachers through having this knowledge. It is lamentably true, however, that educational psychology thus acquired has very little effect upon the practice of teaching. One of the reasons why this is true is because the psychology is learned in one place and supposed to be applied in another. It is geared to one set of conditions and may be quite out of gear with the other.

One may learn out of a book that distributed drill is desirable, that a whole method of learning is better than a part method, that short attentive study on several occasions is better than the same amount of time devoted to study at one sitting, yet one can never receive from such notions imparted in the psychology classroom the same "kick" that comes from trial with one's own pupils. Let the teacher give them a poem to learn and let him appreciate the extent to which the writers are correct in saying that the part method is the one into which learners naturally fall. Then let the teacher instruct the children in the use of a whole method and find out whether or not it *is* better. Let Norsworthy's experiment be given in the regular classroom and let it be noted whether easy come does easy go. If these and similar things

are done, the psychology of learning will take on new and vivid meaning and its applications will be appreciated.

Finally, their reaction upon the teacher spiritually must not be left out of account. The fresh point of view which research always engenders should not be denied to the teacher. The spirit of inquiry, of open-minded alertness to the problems which arise in teaching, will make the teacher free. It will lead him to seek problems and do something, even though it may be but a little, in their solution. Moreover, it will make him expert as a teacher and will make his calling more attractive. Indeed, when looked at from this point of view the teacher's occupation becomes fascinating. He has children to study—not stones, bugs, fossils or old manuscripts, but the most interesting of all possible materials—namely, human beings. Moreover, he has at hand human beings at their most engaging period—childhood and youth. And his children never grow old. In constant procession they present to him, always at the level of childhood, their innumerable interesting aspects. Yet each is different from the other—different in strength, talent, and character; different in origin, growth, and need. If teaching these children is to include studying them, the job of teaching takes on new meaning. Its scope is broadened. Its meaning is enriched. No other calling may then be compared with it. It is the great adventure.

ABILITY GROUPING OF JUNIOR HIGH-SCHOOL PUPILS IN CLEVELAND: SOME PRACTICAL ASPECTS OF THE PROBLEM

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Recently, in Lincoln, Nebraska, "two pupils in the same class, at the same time, and under exactly the same conditions, read the same story, and attempted to answer the same questions about the story. The first pupil, eight years old, read 404 words per minute and answered 15 questions correctly; the second pupil, nine years old, read only 74 words per minute and answered only one question correctly." The other pupils in the class ranged in performance between the two extremes. This example of variation in performance is not an exception. Such is the rule in classes not grouped according to ability.

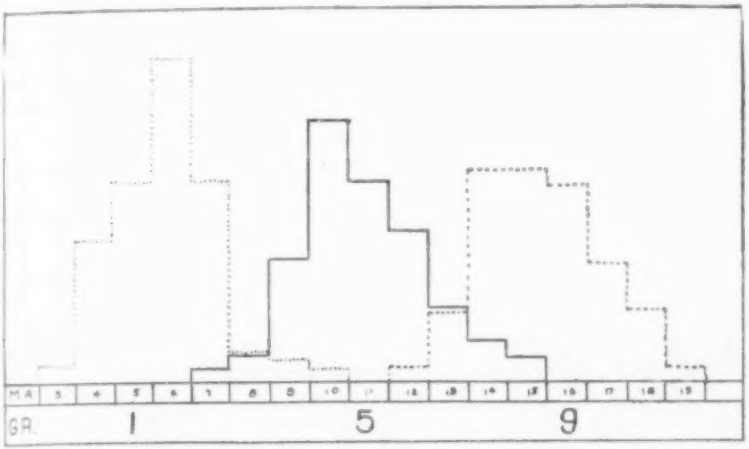
Spread in performance is, without doubt, matched by spread in native ability. We have discovered in the same classroom the feeble-minded child and the brilliant, even sometimes, the precocious child, but the great mass of pupils fall between these extreme types. Of this everyday crowd Francis Hackett says:

> It is the crowd that wears the Cluett-Peabody collars, that reads the *Ladies' Home Journal* and the *Saturday Evening Post*. It is the crowd for whom the nickel was especially coined—the nickel that pays the car fare, that fits the telephone slot—that made Woolworth a millionaire. In that crowd are men and women of every sect and color from the pink of the factory superintendent's bald head to the ebony of the discreetly dressed negro laundress. The general tone is simple, common sense, ordinary, practical America as we meet her most commonly.

With this "crowd" we do most of our school work; and, until lately, we have dealt with it as a crowd, for we did not realize or recognize that within this great mass there was a wide range of ability. To distinguish between the numbskull and the genius is comparatively easy, but to determine the shades of differences in ability within the great middle group is difficult. Scientific research now presents the possibility of supplanting the traditional classifying mechanism of the school by the recog-

nition of differences among children. Pupils may by the aid of educational diagnosis be grouped according to impartial, impersonal, and more accurate standards.

The traditional selective mechanism of the school is woefully inaccurate and, therefore, unjust. To enter the first grade,



M.A. = Mental Age GR. = School Grade

FIGURE 1. THE RANGE IN MENTAL AGES OF THE CHILDREN IN GRADES I, V, AND IX

common school practice demands that the child shall have attained a certain age. Attendance laws define their lower and upper limits by chronological age. If this were an accurate selective process, we should, according to Terman, "invariably find the best records in the first grade made by the oldest pupils." That the reverse is the case requires no extended proof. Dependable data reveal the necessity of a better selective process than the traditional one.

Extent in Range of Ability

A few years ago Terman tested the first- fifth- and ninth-grade children in a typical California school system. Figure 1 will show graphically the range in mental ages of the children in

those three grades.[1] The mental ages of the first-grade pupils ranged from 3 to 11 years; of the fifth-grade pupils, from 7 to 16; and of the ninth-grade pupils, from 12 to 20. These statistical data can be duplicated in many school systems, for they are not exceptions.

Fifty-four pupils who were ready by the traditional selective process to enter the Rice Junior High School, Cleveland, in January, 1922, were studied carefully. They were given the Illinois and the Chapman-Wells tests. A range in intelligence quotients under the Illinois test of from 63 to 141 was found. The Chapman-Wells raw scores for this group ranged from 21 to 115. The median Chapman-Wells raw score for three thousand Cleveland seventh-grade pupils was 62. This gives some idea of the deviation from the median found in this small group of 54.

Expressed in terms of grade standards of achievement, some of the pupils within this group were capable of doing satisfactorily only third- or fourth-grade work, while others were capable of doing ninth- or tenth-grade work. Among these 54, there was a chronological-age range from 123 months to 201 months. The extreme difference in chronological age was six and a half years. The intelligence quotient of the youngest child was fifth from the highest, while that of the oldest child was forty-third.

The Thorndike-McCall Reading Test was given to the VII-B pupils (first semester of the seventh grade) in the Cleveland West Junior High School on May 23, 1922. The range of T-scores was from 31 to 74. A comparison of these scores with grade norms shows that some of these pupils had a reading ability below the mean norm of III-B pupils, while others had a reading ability above the mean norm of XII-A pupils.

In September, 1920, 295 boys and girls who entered the Empire Junior High School were given the Chapman-Wells Test. The highest score, 136, made by this group was that of a boy 12 years 10 months old; the second highest score, 135, was made by a girl of 12 years 6 months. A boy whose age was 13 years 4 months made the lowest score, 28, and among the girls the

[1] Borrowed from Terman's *Intelligence of School Children*. p. 25. (New York, Houghton Mifflin Company, 1919)

lowest score, 30, was made by a pupil whose age was 14 years 2 months. By using a table of equivalents we find that the two brightest pupils of this group, according to the Illinois Intelligence Test, had a mental age of seventeen and a half years, while the two dullest had an approximate mental age of seven.

It is not contended that the Chapman-Wells Test is perfect, but the scholastic records of the twenty-seven pupils who were rated lowest by the test show 52½ times as many failures as those made by the twenty-seven rated highest by the test. The twenty-seven brightest pupils made 33 times as many excellent marks in their studies as those made by the twenty-seven dullest pupils.

Chronological age is not indicative of the ability of the child to learn, and promotion from one grade to the next with clock-like regularity not only continues the gross injustice begun in the first grade, but tends to exaggerate it. The dull pupils tend to become more accelerated and the bright pupils more retarded.

Method of Classifying Pupils

Many persons, even today, object to the classification of pupils by means of intelligence tests. They say that it often happens that a pupil who is rated dull by the tests does good classroom work, while a pupil who is rated bright does poor classroom work. And it is because of these apparent discrepancies between prophesy and actual performance that many are inclined to discredit everything relating to mental measurement.

"Terman reports a correlation of .725 between mental age and the quality of work in the first grade. McCall reports a correlation of .78 in the sixth grade."[2] The lack of perfect correlation between mental age and quality of school work or achievement is undoubtedly due on the part of the pupils to differences in persistence, emotional stability, attitude of the home, health, and reliability. On the part of the school it is due to the differences in the quality of teaching, the length of school year, equipment, and the amount and recency of pertinent instruction.

[2] McCall, *How to Measure in Education*. New York, Macmillan Company, 1922. p. 21.

It seems clear, then, that pupils should not be classified wholly upon the basis of the results of intelligence tests. Even intelligence tests together with achievement tests are not sufficient, though the combination is more satisfactory than either type of test alone. Scholastic records and the teachers' judgment of the pupils' ability should be given weight. At one time the pupils in the Cleveland junior high schools were classified upon the basis of the results of intelligence tests. Many pupils had to be shifted from one section to another, because many of the important factors in determining pupil progress were not taken into consideration.

Beginning in January, 1921, the method of classifying pupils was revised. All VI-A pupils—those ready to enter the junior high school—were given a group intelligence test, and at least one achievement test—many were given two or even three achievement tests. The elementary principals were asked to rank the pupils from best to poorest on the basis of scholastic performance and also to send to the junior high-school principals the pupils' scholastic records, together with any pertinent suggestions or data about individual pupils. Where there was great disagreement between the standard-test results and scholastic performance or the other data submitted by the elementary principals, the pupil was either given an individual test or placed in a certain junior high-school section on trial. Under this plan the results have been very satisfactory. The records show that not more than from 5 to 10 percent of the pupils need to be transferred from one ability group to another. The maintenance of that flexibility in organization which permits the necessary pupil transfer from one section to another is most important. Three groups were formed or recognized under this plan and were known as fast, average, and slow.

As stated before, this plan was first followed in January, 1921. In June, 1921, arithmetic, reading, and language tests were given. The class with the highest average intelligence made the best average score; the next lower group, the next lower average score; and so on down the list, without exception. More than that, it was found that the group with the highest average

intelligence score was doing work more than a year and a half in advance of the slowest group. These tests were given to more than five thousand children and the results are convincing proof of the wisdom of a sane method of classifying pupils upon the basis of ability.

Some Unsolved Problems

1. *How to meet the temperamental differences in pupils.*—In nearly every fast section we find the lazy or indifferent pupil, and in nearly every slow section, the hard worker who makes progress by virtue of his daily grind. It is not unusual to find the bright child who is desirous of avoiding continuous concentration upon problems worthy of his mental power.

2. *How to meet the objections of parents and laymen who maintain that classification is unfair.*—School administrators have not yet completely convinced the parents nor the public generally that classification is right. We still need to give particular attention to this problem.

3. *How to preserve ability grouping when an elective system is maintained.*—Classification is easy when pupils are following a curriculum in which all the subjects are required. When electives are introduced, the problem is greatly complicated. In the small school the maintenance of flexible classification and an elective system, at the same time, is practically impossible. This has been the one great deterrent to classification in the senior high school. At present the need seems to be that we shall use intelligence tests or some equally valid scientific basis for educational guidance in the possible choice of electives. Until some such step is actually, not theoretically, taken, elective systems will prevent a real classification of pupils upon the basis of ability. If this step is taken, it will mean that the school and not the parent, in cases of disagreement, will determine what subject or subjects the child shall carry.

This problem raises a question of policy in regard to junior high-school curricula. If the junior high-school period is one of self-discovery and trial and of educational and vocational self-direction, then the problem of whether it should have an elective

system at all—unless the election of subjects is based upon actual educational guidance—is a serious question. Certainly, so long as the junior high school permits pupils to elect subjects upon the whims of parents, the like or dislike for a teacher, or the example of other children, the elective system is not only an obstacle to the purpose of the junior high school, but is a preventative to flexible classification as well.

4. *The adaptation of subject-matter to the ability of pupils.*—There is little or no excuse for the classification of pupils or the extensive study of their mental capacity, unless we modify the content of courses and methods of teaching for the various ability groups formed.

It is foolish to expect any teacher to teach Dickens' *Christmas Carol* with equal results to a pupil whose T-score is 38 and to another whose T-score is 74. In mathematics it is worse than a waste of time to attempt to teach pupils whose mental age is seven years to solve indirect problems by the equation method, or to find the volumes of irregularly shaped prisms.

A specific example of this lack of modification and its attendant results is found in a study of a group of pupils who elected a foreign language. Nearly one-half of the group had intelligence quotients below 100. At the end of the semester five-sixths of all the failures were made by those whose mental ages were below their chronological ages.

In every Cleveland junior high school the modification of the courses of study has been undertaken, and in some, the work has progressed far enough for revision to be in stenciled form. The principal and faculty of Empire, Brownell, Audubon, and of one or two other schools are using such modified courses in their classes.

5. *Enrichment or acceleration—which?*—Many contend that what is aimed at in acceleration is better accomplished by enrichment. Others maintain that enrichment is an empty word—a word which we affect to make our educational parlance sound better.

That some pupils can safely be accelerated need not be questioned, for it has been tried. Acceleration is not incompatible

with the adaptation of courses to the various ability groups. We do need, however, to look upon acceleration as an individual matter rather than as a general school policy to be applied to all bright children. Dr. Bird T. Baldwin is conducting some interesting and valuable experiments that have a direct bearing upon this problem of acceleration versus enrichment. He maintains that several factors other than mental age should be taken into account when placing pupils.

Nothing should interfere with the needed modification of courses of study; nothing should prevent the acceleration of individual pupils who are being deprived of an equal chance by being held back. The proper modification of courses of study will make the necessity of acceleration less general. There should be flexibility in this whole matter, for flexibility will eliminate much of the discussion of this problem.

We have been bothered somewhat by the more or less academic discussion of the extent to which a pupil may be accelerated. This, again, is an individual problem, the answer to which should depend upon the child's mental age, physical age, health, and temperament. Some time can undoubtedly be saved for bright pupils in the junior high school. Some time can also be saved for them in the elementary school. Some have contended that we should permit pupils to go through the schools as rapidly as possible. This tenet is open to question, especially if during the time pupils are in school they can be given an enriched curriculum.

6. *Teachers' marks.*—Classification brings us face to face with a problem in marking pupils. If pupils are classified and the subject-matter is not modified, then, unless marks become a measure of relative achievement, it is impossible to prevent an abnormal percent of high marks in the fast group and a corresponding percent of low marks and failures in the slow group. When subject-matter has been modified and the pupils in each group are marked upon their relative achievement, there should be about as many high marks in the slow group as in the fast group. The conditions in a certain school in respect to pupils'

failure, before and after the modification of subject-matter and method, are shown in Figures 2 and 3.

Some have tried a system in which the marks carry a distinguishing sign to indicate the group in which they were obtained as, for example, A_1, A_2, A_3. A_1 means a high mark in the fast section; and A_3, a high mark in the slow section. Some scheme may need to be developed to equate these marks when the pupils must use them in transferring to other schools or in entering

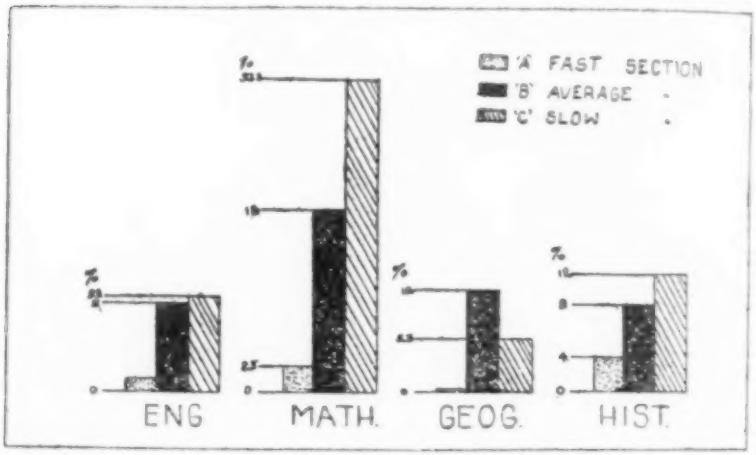


FIGURE 2. THE PERCENT OF FAILURES IN A CERTAIN SCHOOL IN CLASSES SECTIONED UPON THE BASIS OF ABILITY BEFORE THE MODIFICATION OF SUBJECT-MATTER AND METHOD

business. A modified marking system is apt at first to be misunderstood by both pupils and parents, but nevertheless it should be made sufficiently flexible to measure what the child has done in terms of what is expected of the group of which he is a member.

It is not assumed that these are the only problems which warrant discussion. They are a few of those which the practical school man finds confronting him, when he decides that classification is desirable. Much, of course, remains to be done

in refining processes in order that classification may be more scientific and, therefore, more accurate.

The author has assumed that classification is not only desirable but necessary, if the schools are to provide equality of oppor-

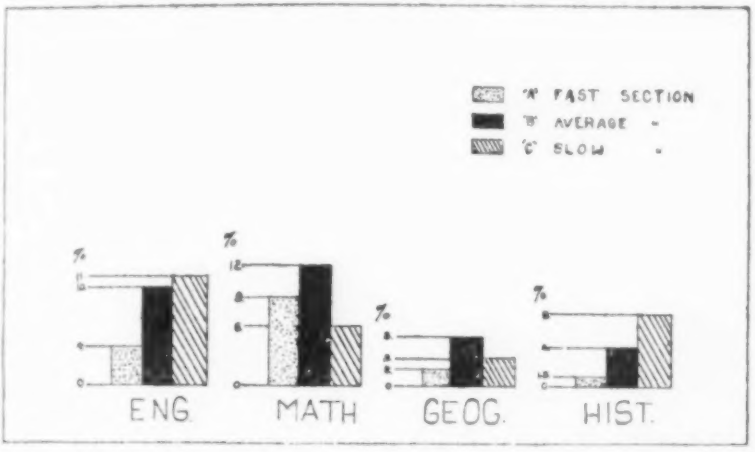


FIGURE 3. THE RESULTS IN THE SAME SCHOOL AFTER THE MODIFICATION OF SUBJECT-MATTER AND METHOD

tunity. Terman has summed up the argument in a forcible manner: "Slow pupils kept always at tasks that are hopelessly beyond their ability, never learn the meaning of success. Bright children miss the mental and moral stimulus which comes from intense application to tasks commensurate with ability."

A TECHNIQUE FOR INVESTIGATIONS IN CLASSROOM METHOD

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Current educational research in the field of classroom method is probably less extensive than in any other field of equal scope and importance. Baldwin's report on educational research during the years 1920-22[1] reviews a total of 533 studies of which only twenty-seven are classified under the head of "Methods of Learning and Teaching." Other summaries of research work undertaken by graduate schools of education, by the Phi Delta Kappa fraternity, and by various other educational associations show about the same proportion of studies in the field of classroom methods. Of the articles appearing in recent volumes of the leading educational journals, those devoted to such problems constitute a still smaller proportion. It is, therefore, safe to say that *methods of teaching,* defined as *methods of helping pupils to learn prescribed subject-matter,* is receiving less than one-fifth of the attention given to productive research in the field of education as a whole. If only those studies were counted which the teacher of average ability can directly apply to the solution of his own teaching problems, such studies would constitute less than one-tenth of the total. Yet teachers as a group are unquestionably more interested in classroom method than in any other field of educational research.

One reason for this situation is probably that the persons most active in educational research are seldom fully conscious of or particularly interested in the *immediate* problems of classroom teachers. This lack of interest is to be expected. The teacher's immediate problems are highly personal, are largely dependent upon previous training and experience, and usually relate to the conditions of a particular group of pupils and of a

[1] Baldwin, Bird T. *Educational Research.* Washington, Government Printing Office, 1923. 76 pp. (U. S. Bureau of Education, Bulletin, 1923, No. 42.)

particular course of study. Since so many variables enter into every such problem, it is only natural that research should be more active in other fields where objective and constant data are more readily found, and that teachers should be left to solve these personal classroom problems as best they may. For the student who has all his time for research, the investigation of these relatively minute and isolated problems in the hope of deriving principles of general validity would be unprofitable labor. For the teacher in service who is confronted by such a problem—e.g., how to make one-third of a given class hand in their daily assignments—the direct investigation of these problems is highly profitable and often imperative.

What follows is the description of a procedure that high-school teachers in service have applied to the solution of such problems with some success. It is here reported for the use which other teachers can make of it and for the further purpose of illustrating a type of research in the field of classroom method which the writer considers promising. The obvious crudities in the technique are in large part due to the attempt to bring the procedure within the limits of the classroom teacher's time and ability.

As developed to date the procedure consists of three main steps: (1) locating the most serious deficiencies of the methods employed by a particular teacher as applied to a particular class; (2) collecting as many alternative methods as possible from professional literature, other teachers, and other available sources; and (3) selecting the most appropriate methods by experiment in the particular class. Following a brief account of the manner in which this procedure was derived, each of the above steps will be outlined, with somewhat greater attention to the first.

Method of Deriving the Procedure

It was assumed to begin with that the value of any method of teaching depends directly upon the teacher's abilities, the pupils' responses, and the subject-matter taught. In other words,

there is no such thing as a specific classroom method which is never justifiable under any circumstances. The first problem in deriving the procedure was, therefore, to find some means of estimating the relative merits of the teacher's different classroom activities *in terms of a particular class*.

A basis for such an estimate was furnished by a difficulty-analysis of high-school teachers in service. Two hundred teachers in grades VII to XII were selected on the basis of experience, amount of professional training, and subjects taught, so as to cover the normal range in each of these three respects. Each of these teachers was asked to submit two or more of the most troublesome difficulties he had met in teaching, with concrete examples to illustrate each difficulty. About five hundred difficulties were received. These were classified and duplicates rejected with the result that some three hundred difficulties remained. Each of these typical difficulties was then analyzed into the various pupil conditions which, when they exist in combination, cause the difficulty.

For example, the difficulty, "How to make the course in ancient history seem worth while," was analyzed into such pupil conditions as curiosity concerning primitive civilizations, satisfaction from participating in class discussions, interest in the textbook, acquaintance with historical fiction, understanding of the teacher's purpose in daily assignments, recognition of the connection between life situations and situations discussed in class, and the like. The reason for this analysis is simply that a teaching difficulty disappears when the several conditions causing the difficulty are located and then successively removed by remedial methods appropriate to each of the unsatisfactory conditions.

From this list of pupil conditions a check list was constructed which a teacher might apply to all pupils in the class individually. The purpose was to determine which of these conditions are most in need of attention for the class as a whole. In order to simplify the use of the check list, these conditions were stated in the form of questions. Thus when the check list is applied

to a given class, the checking of a particular question for certain pupils means that the condition is not satisfactory so far as these pupils are concerned. By simply adding the checks for each question the teacher obtains an index of the frequency of these unsatisfactory conditions in the given class. Having located these conditions the teacher can then collect methods to remove them and determine by experiment which methods are most effective. The questions shown below have been selected from the original list. The selection is based on the experience of fifty-three teachers who have applied the questions of the original list to their own classes. The selected list therefore contains only such questions as have proved useful in revealing deficiencies of classroom methods.

The second problem in deriving the procedure was to evaluate the sources from which alternative methods might be found as remedies for the unsatisfactory conditions revealed by the check list. In selecting these sources, their availability for teachers in service was, of course, the determining factor. Experimental evaluation was, therefore, confined to the following sources which are here listed in order of decreasing value as indicated by the results of forty studies employing this procedure: (1) the teacher's own analysis of and suggestions toward the improvement of the classroom methods found to be least satisfactory; (2) the judgment of other teachers of the same subject and grade; (3) professional journals and books on special methods; and (4) the pupils of the given class. Each of these sources can be readily consulted when the teacher knows definitely to what conditions the methods must apply.

The third problem in deriving the procedure was to outline a method whereby the teacher might try out the various methods obtained from the above sources in order to select those most effective in meeting the given conditions. The purpose of such try-outs must, of course, determine the technique employed so that it is only possible to set down certain general steps which the studies have indicated to be both essential and sufficient in the large majority of cases: (1) classifying the suggested meth-

ods for the purpose of grouping together those which are similar in type; (2) writing down the distinctive features of each type for greater clearness; (3) constructing criteria in the form of informal tests or rating scales by which to compare the effects of the different methods; and (4) trying out the typical methods, one at a time, and recording the proportional improvement in the response secured by each.

Procedure

For greater clearness the procedure as outlined below is presented in the form of directions covering each step. While each of these steps has been found important in the applications of the procedure that have been made to date, it is entirely probable that some steps are unnecessary in the investigation of certain difficulties that confront inexperienced teachers. Each step, therefore, should be followed so that the relative importance of the steps may be found by experiment.

Locating Unsatisfactory Conditions in the Given Class

1. Look over the check list of questions below. Each of these questions is so phrased that a negative answer indicates an unsatisfactory condition in the class to which the check list is applied. These negative answers, therefore, will often help you to discover specific respects in which your methods of teaching can be improved. The directions should be followed in order to use the check list for this purpose.
2. Read through the entire list of questions in Group A and check on the left margin those questions which you believe do not apply at all to the particular class you are considering. The questions so checked may be omitted from the list, but all the questions do apply to typical high-school classes in certain subjects.
3. Under the appropriate headings add other questions which are not listed but which apply to conditions unfavorable to the complete success of any pupil or pupils in the class. Give a number to each question you add from the unused numbers of each group of questions. (It should be noted that such questions as number 13, 25, and 31 are so general as to apply to any course and class. It is therefore best to analyze all such general questions into more specific subquestions which will apply to the particular class you are investigating. For example, a course in foreign language will require different abilities from a course in natural science and consequently different methods of developing these abilities. Such abilities peculiar to the learning of the given subject should be added to the check list.)

4. Copy the numbers referring to the questions of Group A, as revised, down the left margin of a sheet of cross-ruled paper about two feet long and one foot wide. Then write the names of the pupils in the class along the top of the sheet with a blank column below each name. (See specimen toward the close of this article.)
5. Beginning with the pupil whose name appears first on the top line, read down the list of questions represented by the list of numbers on the left margin of the sheet and place a cross under the pupil's name and to the right of each number of a question to which you reply "no" in the case of this pupil. Place *o* instead of *x* if you are unable to decide between yes and no. Then follow through all of the questions of Group A with each other pupil in the same way.

   NOTE.—In checking the list it is important that the sheet show a horizontal rather than a vertical series of crosses. If when you have finished checking the questions for each pupil, the crosses are found in vertical columns rather than in horizontal lines, this merely means that you have distinguished the poor pupils from the good pupils. You have not distinguished poor methods from good methods, which is the important purpose in applying the check list. It will be easier to secure this horizontal tendency in the crosses if you ask yourself in applying each question to each pupil—"Is this pupil as satisfactory in this respect as he should be in view of his natural or present abilities?" Use the pupil's possibilities as your basis for decision as to the success or failure of his responses rather than the average response of the given class.
6. When you have finished checking, add the *x*'s and then the *o*'s in each horizontal line and write the sums in the left margin under the question number. These sums thus serve as an index of the importance of each question as applied to this class. Relist the questions by number according to these indexes; that is, place the question most frequently checked first, and so on until you have listed all questions checked for at least half of the pupils.

CHECK LIST FOR CLASS DIAGNOSIS

The questions below may be used to suggest conditions which affect the pupils' learning, and thereby to determine the relative merits of different teaching methods. Apply the questions of Group A first, as directed above, to each pupil in the class. Then apply such questions in Groups B, C, and D as may serve to explain the unsatisfactory conditions revealed by applying the questions of Group A. (P means "the pupil.")

GROUP A. CONCERNING THE PUPIL'S ABILITY TO MEET THE COURSE REQUIREMENTS

Classroom Environment

1. Does P respond satisfactorily to changes in your tone of voice?
2. Does P contribute toward a good "mental atmosphere" in the classroom?
3. Is P free from distracting noises or objects in the classroom?

4. Does P's seat in your classroom permit a clear view of the board?
5. Does P's response indicate that other physical factors in the classroom environment are satisfactory—e.g., light, heat, ventilation, etc.?

Personal Qualities

11. Does P complete assignments?
12. Does P always hand in original work?
13. Does P show interest in the subject in class?
14. Is P friendly toward you?
15. Does P cooperate with you in the work of the course?
16. Is P anxious to secure a good mark in the course?

Attitude toward the Course

21. Has P any curiosity concerning the subject-matter of the course?
22. Does P participate satisfactorily in class discussion?
23. Is P interested in the textbook?
24. Does P understand your purpose in making assignments?
25. Can P apply a life-setting to situations discussed in class?
26. Does P respond satisfactorily to your attempts to "motivate" the course?
27. Does P make recitations or comments which are interesting to other pupils?
28. Can P relate his out-of-school interests to your course?

Use of Abilities

31. Is P making sufficient use of his abilities? (Add questions for specific abilities in which deficient.)
32. Does P learn at the rate of the average member of the class?
33. Has P sufficient time in class to become adjusted to different activities, e.g., understanding the assignment, performing drill exercises, solving problems, and making appreciations?
34. Does P usually have enough to do in class to keep him busy?
35. Is P usually a helpful influence toward order in the classroom?

Learning Activities

41. Does P seem to have genuine reasons for studying your subject?
42. Does P know how to study your subject as well as the average pupil?
43. Does P study at the same time and place?
44. Does P study with a clear knowledge of what he is trying to do?
45. Can P successfully apply principles to the solution of new problems?
46. Is P able to organize the materials studied for review purposes?
47. Can P outline and organize oral and written reports successfully?
48. Can P summarize material in order to see it as a whole?
49. Can P select essentials in reading and class discussion?
50. Can P express himself fluently and with sufficient accuracy?
51. Is P able to grasp an author's meaning in reasonable time?
52. Does P respond satisfactorily to questions asked of the class as a whole?
53. Does P "take the challenge" when a problem is given in class?
54. Is P able to form independent judgments?

55. Can P keep pace with the class discussion?
56. Does P see connections between explanatory details, illustrations, etc. and main issues?
57. Is P able to abstract principles from concrete examples?
58. Can P grasp the real point of your questions?
59. Can P find the data necessary to solve the problem you present?
60. Does P connect one lesson with previous lessons?
61. Has P a critical attitude toward statements made by other pupils?
62. Can P distinguish between superficial and adequate views expressed in class?
63. Does P remember important principles?
64. Does P remember specific facts you consider important?
65. Does P make a satisfactory showing on class tests? (Specify here the types of test in which the pupil does poorly.)
66. Does P memorize rules correctly?
67. Does P perform drill exercises successfully out of class?
68. Does P perform drill exercises successfully in class?
69. Does P form a clear general estimate or appreciation of a new unit of work before attempting to learn it in detail?
70. Does P persevere in drill work till the skill is mastered?
71. Is P able to use the text materials of the course as a means to useful command of the subject-matter?
72. Can P follow specific directions?
73. Is P able to apply various rules, principles, etc., in combinations?
74. Can P apply the course to real situations in the way it must be applied in real life or in further study of the subject?

The questions of Groups B, C, and D are not reproduced below for lack of space. The headings under which the questions of these groups are classified are as follows:

GROUP B. CONCERNING THE PUPIL'S HOME CONDITIONS AND THE EFFECT OF PREVIOUS TRAINING IN YOUR SUBJECT

Home Conditions
Previous School Conditions

GROUP C. CONCERNING THE PUPIL'S PHYSICAL AND MENTAL TRAITS

General
Expressed in School

GROUP D. CONCERNING THE PUPIL'S ABILITY TO MAKE USE OF YOUR COURSE AFTER HAVING COMPLETED IT

Vocational Applications
General Applications

Steps in Collecting Remedial Methods

1. The questions you have relisted will ordinarily indicate conditions in the given class which can be improved by appropriate teaching procedures. In some cases the appropriate method will be obvious as

soon as you discover to what proportion of the class the condition applies. When other methods which are likely to improve the condition are not obvious, further suggestions may be secured by selecting appropriate questions from Groups B, C, and D and applying these to each pupil as the questions from Group A were applied. You will be unable to answer many of these questions without further information than you are likely to have about pupils' home conditions and the like. The facts necessary to explain these conditions should therefore be obtained by a brief test to discover what pupils are deficient in a particular ability or related abilities; or by a questionnaire which calls for statements by pupils concerning their home conditions, interest in the course, etc.; or by private interviews with individual pupils in which you can find out by tactful questioning how they react to the methods most frequently employed. The information obtained by such tests, questionnaires, or interviews should be carefully recorded for later reference.

2. The data obtained to this point will usually indicate some major deficiency in your teaching to which other deficiencies are more or less closely related. To locate this major deficiency, list the more serious conditions revealed by the check list and combine them into groups of related difficulties.
3. Write down as many as you can of the methods (i.e., things you do in the classroom) which have to do with the conditions listed. Specify various types of subject-matter with which different methods may be used.
4. Write down as many other methods (i.e., ways of improving these conditions) as you can think out, for each distinct type of subject-matter in which the difficulty appears.
5. Supplement this list of methods to meet the conditions by adding such others as you find suggested by books or articles on methods of teaching the given subject and by books on general methods of teaching. It is seldom wise to spend more time on this than is required to find out what the books and articles, located in indexes, have to suggest toward meeting the given difficulties.
6. Interview other successful and experienced teachers of your subject, grade, and school or of other schools in your community. To make these interviews effective an appointment should be made with the teacher in advance, and about half an hour reserved for the interview. At the outset of the interview describe in outline one of the conditions in your class which you consider most serious and most general. Then ask each of the following questions about this difficulty, and repeat them for such other difficult conditions as you have selected for investigation: (Be sure to illustrate each difficulty by a single concrete situation.)
   a. Have you ever met this difficulty in your teaching?
   b. If so, what did you do about it, or what do you think should be done?
   c. If not, what can you suggest as a means of preventing it?

d. What help do you think I can find in the following remedies? (Read the methods you have already collected.)
e. Please list these remedies in what you consider the order of relative merit and suggest any others you can.

Continue these interviews with all teachers who are likely to offer practical suggestions until you have interviewed at least five teachers. It is absolutely essential that as much as possible of what the teachers say be written down during the interview. A second draft of the interview can then be written at your leisure in which the essential points are taken out.

7. In case the condition you are investigating has to do with the pupils' attitude toward the course, their methods of study, their understanding of explanations, and similar matters in connection with the work of the class, much help can be obtained sometimes from the pupils themselves. It is best to select some three or four pupils of good judgment from the particular class and ask them such questions as the following:
   a. "There are certain conditions in this class that I am trying to correct and I am asking you for some advice." Then describe a condition. "What do you think might be done to remedy the situation?"
   b. Have you ever been in another class where this condition existed? What did the teacher do about it? Did it work?

   The pupils' comments should be recorded as carefully as their definiteness permits, though such comments are more likely to suggest useful methods than to propose them directly.
8. Lay out all of the suggestions received from each of the above sources as contained in your notes—namely the suggestions as to remedial methods worked out by yourself, those found in professional literature, and those obtained by interviews with teachers and pupils. Write each suggestion you consider promising on a separate slip of paper. Group together those suggestions which apply to the same difficulty and divide each group into sub-groups containing suggestions that are similar in type.

Steps in Selecting Appropriate Methods

1. Select from the methods collected for a given class condition the type of method which you consider most promising. Write out the distinctive features of this method as applied to the specific subject-matter which you may have found difficult to teach or to any typical item of subject-matter.
2. Construct simple tests of the pupils' responses to the method you consider most likely to improve the troublesome condition. The nature of these tests will depend, of course, on what the condition is. Personal qualities can be estimated by recording such classroom behavior as concerns questions 11 to 16 of the check list. Attitude toward the course can be estimated by the group response to certain general directions, outside reading assignments, suggested projects,

optional work, and the like. Specific learning abilities can be tested or estimated by simply requiring the entire class to do a definite piece of work involving the particular ability—to learn vocabularies, to apply a given principle, to summarize material, and so forth. While a test yielding objective scores is, of course, much to be desired, the labor of constructing such tests is often not worth the trouble for this particular purpose. In the majority of cases the general response of the class will make it apparent to the teacher when the best method of meeting the given difficulty has been found.

3. Where the application of the method considered most promising does not appear to remedy the troublesome condition, these tests must be taken more seriously. An application of one method and a recording of the results by test, rating scale, or other criteria should be followed by an application of a second method and a second application of the criteria. Proportional improvement in the response to each of the methods applied should indicate which method on the whole produces the most satisfactory results.

The Procedure Illustrated

Applying the check list.—The accompanying table shows the application of the check list to a certain class in IX-B English. Only the questions which were checked are included. The first column shows the question numbers according to the check list. Thus question No. 11 is "Does pupil complete assignments?" According to the second column, ten pupils fail in this respect; and according to the entries under the pupils' letters the individuals who fail are identified.

It is apparent that this class situation centers about the assignment. While each of the pupils here listed is deficient in class tests (No. 65), the reasons for such deficiencies are suggested by the other conditions which are checked ten times or more. Thus it appears that remedies are to be sought for the failure to hand in assignments, for the lack of interest in class, for failure to participate in class discussion, for inability to select essentials from reading, for inability to remember essentials, and for various other deficiencies which effective assignments should largely remove. The assignment was therefore selected as the subject of investigation.

Collecting remedial methods.—The following twenty-five suggestions were received from the various sources described above

and selected from many other suggestions as most appropriate to the situation represented in the table of ratings:

1. Try to base all assignments, so far as possible, upon difficulties raised by the class. "Who finds this hard? How many would like to be able to do this, or to know this? Well, then, let's do this for tomorrow, etc."
2. Offer strong inducements to encourage pupils to bring in pertinent illustrations of points discussed in class from short stories, articles, newspapers, and daily conversation. Follow such leads in daily assignments as these illustrations suggest.

APPLICATION OF THE CHECK LIST TO A IX-B ENGLISH CLASS

Question Number	No. of X's	No. of O's	Pupils															
			A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
11	10	1	x	x	x		o	x		x		x	x	x	x		x	
12	2	3				x		x				o	o		o			
13	8	0		x		x		x		x		x		x		x		x
14	3	3	x			x	o					x	o			o		
15	9	0	x		x		x		x		x	x			x		x	x
16	6	2	o	x		o	x	x				x	x			x		
21	13	3	x	x	x	x	x	o	x	x	x	x	x	o	x	o	x	x
22	13	0	x	x	x		x		x	x	x		x	x	x	x	x	x
23	11	1	x	o	x	x	x	x	x	x	x	x	x	x	x		x	x
24	8	3		x	x	o		x	o	x	x			x	o	x		x
25	5	0	x				x		x				x				x	
26	3	2			x		o			x				o				x
27	8	0	x		x		x		x	x	x	x			x			
28	8	2	x		o	x		x			o		x	x		x	x	x
31	13	3	x	x	x	x	x	x	x	x	o	o	o	x	x	x	x	x
41	7	3		x	o	x	o		x			x	x		x	x		o
42	8	2	x	o		o		x			x			x	x	x	x	x
49	14	1		o	x	x	x	x	x	x	x	x	x	x	x	x	x	x
50	2	0					x					x						
51	7	0	x			x			x				x		x		x	x
56	10	6	x	o	x	o	o	o	x	x	x	x	o	x	x	x	x	o
60	6	0	x				x	x		x			x		x			
63	14	0		x	x	x	x	x	x	x	x	x	x	x	x	x		x
64	14	0	x	x	x	x	x		x	x	x	x	x	x	x		x	x
65	16	0	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
66	9	0	x	x	x				x	x		x	x			x	x	
67	12	4	x	x	x	x	x	x	x	o	o	o	x	x	x	o	x	x
71	15	0	x	x	x	x		x	x	x	x	x	x	x	x	x	x	x
74	14	2	x	x	x	o	x	x	x	x	x	x	x	o	x	x	x	x

3. Take time in introducing a new unit to illustrate its importance and also its interesting features; e.g., in introducing punctuation show that entirely opposite meanings result from simple changes in the punctuation of the same sentence:

> The teacher says the pupil is a fool.
> "The teacher," says the pupil, "is a fool."

4. Always allow time for pupils to begin assignments in class. Look over their work or call for questions, thus making sure that the purpose of the assignment is understood and that pupils are able to go ahead with it.
5. In cases of wilful failure to complete an assignment out of class, the first offenders, after the new policy is announced, should be required to complete it after school the same day.
6. Set up a definite list of requirements for each new unit of work, and illustrate these requirements, where possible, in terms of minimum, average, and advanced assignments.
7. Seat pupils together who tend to complete minimum, average, or maximum assignments. Vary the difficulty of each type of assignment in order to keep these groups approximately equal in size.
8. To reduce the monotony of questioning the class on the previous day's assignment, give a five-minute test at least every other day at the beginning of the period. Then have papers exchanged and the errors marked as the teacher or some pupil reads the correct answers. Then let those who are deficient in the test correct it while those who reach the desired standard proceed with the next minimum assignment.
9. Appoint those pupils as teacher's assistants who complete advanced assignments for the preceding unit of work. Delegate to these pupils the duty of assisting pupils in trouble with the day's work.
10. No written composition should be accepted in which it is apparent that the writer has nothing to say. When themes are empty of ideas there is no motive for expression in proper form. The pupil must be taught to write for a particular audience, and the teacher should help him to interest that audience.
11. Encourage pupils in English classes to write reports required in other subjects so that they can profit by their efforts to improve the form of expression.
12. In correcting assigned written compositions pay marked attention only to one thing at a time, e.g., paragraphing, choice of words, and the like.
13. Have all required themes written in class and corrected in class by other pupils as far as possible. The teacher can then coach pupils who are in difficulty.
14. Keep a box in the classroom into which pupils can drop suggestions for theme topics. Allow the more popular topics to be used for themes to be written in class.
15. Consult the local librarian for a list of books of fiction which are favorites among ninth-grade pupils. Refer to such of these as may be related to required reading. Post titles of short stories which present striking situations, characters, and ideas when such can be used to reinforce class discussion.
16. Stimulate interest in assigned readings by systematically connecting literary events and characters with current events and live people

in which the pupils are actively interested. Force this connection if you must, but don't make the mistake of supposing that any event is interesting because it is current.

17. Post lists of books for outside reading under the title "Interesting and exciting books that are worth while." Then require one book to be read at stated intervals, but allow any book from the list to be chosen.
18. In case of failure to grasp the essentials of a reading assignment, give the class a list of questions to which they must find answers.
19. Give practice in finding essentials by study-tests,—i.e., by questions about a passage, read rapidly in class, which the pupils must answer without re-reading.
20. To secure better attention to oral reports, appoint two pupils to prepare questions on a report after it has been made. Then give some of these questions as a test to the rest of the class.
21. Assign no drill exercises to be done out of class. When such exercises are done in class, be sure that no pupils are required to do the work who do not need it.
22. Abandon formal spelling lessons. Insist on each pupil keeping a complete list of words misspelled and assign for study those words which are misspelled by each pupil. Words missed by as many as one-quarter of the class should be carefully taught.
23. Teach only such rules of punctuation as the pupils are likely to use in the sort of writing they will have to do after they leave school. It is unwise to assign rules of punctuation to be learned until after errors have been collected which involve the rules assigned.
24. Let the pupils keep lists of grammatical errors in notebooks with such rules as are necessary to explain these errors, rather than assign rules from the text.
25. Assign only such grammar work to be done out of class as is based on errors made by the pupils themselves in speech and writing.

Selecting the most effective methods.—At least one attempt was made to apply each of these 25 suggested procedures to the given class. Those methods which involved a change in policy were employed for a period of approximately one week. Some improvement in the class response seemed to result from the application of each procedure. Some, however, were not adopted as part of the class routine because they required more effort on the teacher's part than the improvement seemed to justify. Some others were already being followed at the time the investigation was made. In selecting from the above list the procedures to be adopted, the following simple criteria seemed sufficient: (1) the

proportional increase in the number of pupils handing in written assignments when due; (2) the proportional increase in the number of pupils participating in general class discussions; (3) the proportional increase in the number of prepared oral reports; and (4) the estimated increase in the amount and scope of outside reading.

On the basis of these criteria the following items were rejected: 5, 6, 7, 9, 11, 14, 15, 20, and 23. The rest were adopted with satisfactory results.

Problems

High-school teachers and others to whom this approach to the investigation of problems in classroom method appears hopeful are invited to consider the following problems in the standardization of procedure: (1) the selection and validation of check list questions for particular subjects and grades; (2) the standardization of a technique for the discovery from available sources of specific classroom methods applicable to the unsatisfactory conditions of a given class; and (3) the simplification of experimental techniques and the construction of informal tests which will indicate the amount of improvement in specific classroom conditions to which various remedial methods are successively applied.

A GROUP INTELLIGENCE EXAMINATION WITHOUT PREPARED BLANKS

(Revised Form for Grades VI to XII)

J. Crosby Chapman
Yale University

In the December (1920) issue of this Journal[1] the author described a group intelligence test suitable for grades VI to XII. The unique feature of this examination was that its use did not necessitate the purchase of the usual prepared blanks. Since the advantages and disadvantages of such a test were there enumerated and discussed, they need not be repeated here. Apart from its economy it has the obvious advantage of being independent of reading—an advantage which the usual group intelligence examination does not possess. In view of the high cost of testing, it would seem that there is great scope for a test which can be given without the necessity of procuring the usual, somewhat expensive, prepared blanks. Without cost this type of examination may be used in any school system by any teacher. This test has been helpful in training students in the technique of test administration. It has been employed as the sole instrument for purposes of classification, and it has been used as cumulative evidence with several of the more orthodox types of examination. In the original form the test has rendered a wide and diverse service. The writer is familiar with one situation in which a single copy was instrumental in testing two thousand children and another instance in which the number ran to four thousand.

In certain cases where the original form was given in conjunction with other intelligence examinations, the full records are available and the correlations have been determined. These are collected in Table I. As all similar data indicate, the range in the correlation value is somewhat great, depending upon the local conditions and the degree of heterogeneity. But the values

[1] "A Group Intelligence Examination without Prepared Blanks," *Journal of Educational Research*, 2:777-86, December, 1920.

indicate a high probability that this form of test serves the same general function as the more orthodox forms.

Soon after the publication of the original article, the one hundred reprints and the large number of mimeographed copies made in several centers were exhausted. The applications for this test which are still being received indicate that there is a demand for an instrument of this inexpensive nature. In view of this demand and in view of certain shortcomings which were present in the older form of test, it has been thought desirable

TABLE I. CORRELATION OF THE GROUP TEST WITHOUT BLANKS (ORIGINAL FORM) WITH VARIOUS GROUP INTELLIGENCE TESTS

Test	Unselected Group Grade	*N*	Correlation
Terman	VIII	217	.80
Otis	VIII	41	.78
Otis	VIII	29	.66
Otis	VIII	20	.81
Haggerty	VIII	22	.57
National	VIII	182	.67
Haggerty	VII	26	.86
Terman	VII	58	.71
Terman	VII	77	.68
Pressey	VII	208	.53
Illinois	VI	34	.70

to construct a new form. Since there are no financial advantages to a publisher in circulating an examination of this kind (devised as it is to obviate the necessity of purchasing blanks), the hospitality of the columns of the *Journal of Educational Research* is once more sought.

The shortcomings of the original form of the examination were:

1. The elements within each part of the test were not in all cases well graded on the basis of the degree of difficulty—difficulty being determined by means of the usual assumptions with reference to the normal distribution of ability.

2. There was an undesirable guessing factor[2] in the sentence-understanding section of the examination.

3. Scoring by the pupils, which is an advantageous part of this test, was made difficult in the opposites section of the test by the number of possible alternatives.

4. The time factor was not sufficient for the purely mechanical writing in the case of some of the younger and slower pupils.

To obviate these demerits the present revised form of the Group Intelligence Test without Blanks was constructed.

It will be remembered that the original form consisted of one hundred elements, divided equally into four tests: (1) information, (2) arithmetic, (3) opposites, and (4) sentence understanding. Furthermore, an interval of five seconds was allowed between the close of the dictation of one question and the reading of the next one. In the new form of examination, the opposites test has been changed to facilitate objective scoring, and the sentence-understanding test has been replaced by an analogies test to eliminate the undesirable guessing factor and the consequent complication in scoring. Furthermore, it was decided, as a result of criticism and later experimentation, that the best interval of time was 8 seconds. By these changes and by the improved grading of the difficulty of the elements comprising each of the four parts of the test the four disadvantages just mentioned have been eliminated.

For evaluating the difficulty of each element in an examination of this type, certain statistical procedures which cannot be employed in the case of the ordinary group test are feasible. As in the Binet examination each element is administered as a separate unit, and it is, therefore, possible to study it in isolation and to determine its suitability and difficulty for any group. In the first attempt at the construction of the new test, each element proposed for introduction was tried out on unselected groups of pupils from grades VI, VII, and VIII, and only those elements were selected that exhibited marked differences in achievements for the two groups. This process, however, was too laborious. To

[2] Chapman, J. Crosby. "Individual Injustice and Guessing in the True-False Examination," *Journal of Applied Psychology*, 6:342-48, December, 1922.

get reliable results it was necessary to use large numbers. It was later replaced by trying each element out on one hundred and fifty unselected eighth-grade children. On the basis of these results, there were selected for each test, from the large number of elements of varying degrees of difficulty, those which approximated to the following percents of correct answers: 100, 99, 98, 96, 95, 92, 89, 84, 79, 73, 65, 58, 50, 42, 35, 27, 21, 15, 11, 8, 5, 4, 2, 1, 0. By following these percents each of the twenty-five elements in each test is separated from the next element in difficulty by approximately .2 sigma[3] of the ability of the group in question.

The test in its new form, with full directions for administering and scoring, follows.

A GROUP INTELLIGENCE EXAMINATION WITHOUT PREPARED BLANKS[4]

(Suitable for grades VI to XII)

PREPARATION

Use paper ruled on both sides.

Instruct the pupils to make two creases in their paper by folding it from top to bottom. The creases must be so spaced that three equal rectangles are formed. This furnishes three columns in which to write the answers. The folding is merely to economize paper.

Have each pupil write his name, age, grade, school, and other desired information at the top of the sheet.

Instruct the pupils, using both sides of the sheet, to number, line by line, from one to a hundred, passing down the whole length of one rectangle before going on to the next one. Have the numbering done as near the left edge of the column as possible in order to leave the maximum amount of room for writing answers.

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[3] Owing to the unreliability of the measures especially at the extremes, this statement is only very roughly true.

[4] Copies of this test, in any number, with full directions and norms, can be obtained for 25 cents per copy, from the author, at the Department of Education, Yale University, New Haven, Conn. It will be noted that only one copy of the test is necessary to administer an intelligence examination without cost to a whole school or even to a school system.

The author is indebted to Miss Norma E. Cutts, of the New Haven School System, for help in the selection of certain elements in the first parts of the examination.

General Explanation

Explain to the pupils the general nature of the test.

Tell the pupils to do their best and also inform them that the class is going to mark the papers at the close of the examination. Warn the pupils to keep their papers from the view of those around them.

General Note to the Examiner

1. Read each question deliberately and carefully, in a manner calculated to give the pupils the best possible chance.

2. If the pupils are writing the answer to the previous question, do not attempt to make them stop writing as you dictate the next question. Go straight ahead with the examination. The pupil who falls behind and works slowly will handicap himself if he gets so much behind that he cannot give his undivided attention to the coming question.

3. Let the whole procedure be as automatic as possible. It is well to practice on a small group before trying large groups.

4. Follow the prescribed procedure exactly. The valid interpretation of the results of the test necessitates uniform administration by the examiner.

5. Provide each pupil with scrap paper for figuring or making notes; this is particularly necessary in the arithmetic examples. The scrap paper should be provided before the examination starts.

Information Test

Tell the pupils that twenty-five questions are to be asked. To each of these questions they must write the answer without delay. Great care must be taken to see that the answer is written opposite the number which corresponds to the question. If they do not know the answer, they must draw a dash and wait for the next question. Dictate each question *once and once only.*

Give the pupils clearly to understand that the question will be given once; if they do not understand or cannot answer it, they must not hold up their hands, but draw a dash and wait for the next question. Tell them not to get discouraged if at any time they get "muddled"; simply wait for the next question.

After dictating a question, let eight seconds elapse, measured by counting eight to one's self at an even rate previously noted by counting against a watch. Then proceed to next question. Always call the number of the question with the question itself.

(Note.—Most examiners will tend to count too rapidly unless they check up their speed before they start by counting with a watch.)

		Answer or Acceptable Substitute
1.	What is the house in which the President of the United States lives, called?	White House
2.	What do we call a boat that travels under water?	submarine
3.	Opposite to what point on the compass does the sun set?	east
4.	What two coins add up exactly to ten cents?	two nickels (nickels)
5.	How often in three days does the tide turn?	12 (6)
6.	If a large group of men refuse to work, what is this action called?	strike
7.	What do we call a building which houses automobiles?	garage
8.	Below what temperature Fahrenheit does water freeze?	32
9.	What bill is next larger than a five-dollar bill?	10
10.	What relation is the brother of my mother to my sister?	uncle
11.	By what means is the bulk of government money raised?	taxation, taxes
12.	What two coins add up to exactly 35 cents?	quarter and dime
13.	From what animal do we get mutton?	sheep (lamb)
14.	How many years are there in a century and a half?	150
15.	What is the commonest make of automobile in the U. S.?	Ford
16.	In what direction does your right shoulder point when your back is to the north?	west
17.	With what does one play on the violin?	bow
18.	For what two words do the letters P. S. at the end of a letter stand?	post script
19.	With what great invention is the name of Marconi associated?	wireless (radio)
20.	How do you write the number of minutes in an hour in Roman numerals?	LX
21.	What special name besides shoal is applied to a large number of fish swimming together?	school
22.	Using all the letters just once, what other word can be made from the letters of the word past, *p-a-s-t*?	taps, pats, spat
23.	How many days are there in January and April combined?	61
24.	With what instrument is temperature usually measured?	thermometer
25.	In what season do plants usually begin to grow?	spring

Arithmetic Test

The procedure is the same as in the information test, with one exception that the question is read *twice*. Thus—read the number of

the question once and the question *twice* and then count eight (8) silently and pass on to the next question. (See that each pupil has a piece of scrap paper on which to figure.)

26.	I buy 20 books and give half of them away, then I buy 5 more, how many have I left?	15
27.	Three boys bought a tent for $24.75, sharing expenses equally. How much did each boy pay?	8.25
28.	A house rents for $45 a month, what is the rent for a year?	540.
29.	A contractor employs 6 men at $4 a day apiece. How much does he pay for 3 days work?	72
30.	If it takes 4 men 3 days to dig a 120-foot drain, how many men are needed to dig it in half a day?	24
31.	A man spends one-fourth of his salary for board and room, and one-half for all other expenses. What part does he save?	¼
32.	A piece of ribbon 3⅞ yards long is cut from a 10-yard piece. How much is left?	6⅛
33.	Mary's grandfather is 79 years old. If he lives, in how many years will he be 100 years old?	21
34.	If an aeroplane goes 250 yards in 10 seconds, how many yards does it go in one-fifth of a second?	5
35.	Three quarts of ice cream are enough for 18 people. How many quarts are needed for 90 people?	15
36.	A woman bought two dresses, one costing $43.75 and the other, $37.50. How much more did one cost than the other?	6.25
37.	What number multiplied by 7 gives a product of 28?	4
38.	How long will it take to earn $28 at $1.75 a day?	16
39.	A tight board fence 120 feet long is made of 9-inch boards nailed upright. How many are required?	160
40.	After travelling 65 miles, how far must I go to complete a trip of 150 miles?	85
41.	If a train goes 300 yards in 10 seconds, how many feet does it go in one-fifteenth of a second?	6
42.	What number when squared is one-fourth of 100?	5
43.	A sea captain 60 years old has spent one-fourth of his life on land. How many years has he spent on the sea?	45
44.	What number squared, when added to 21, makes one-half of 242?	10
45.	If 2½ dozen eggs cost $1.00, what is the price per dozen?	.40
46.	If a horse eats three-eighths of a bushel of oats a day, how long will 12 bushels last?	32
47.	Two men, A and B, work on a job. B works twice as fast as A. How long will it take the two of them to do a job that A can do alone in 21 hours?	7
48.	A man's salary is $18 per week. He spends one-half of it for board and room and one-fourth for all other expenses. How much does he save per week?	4.50
49.	If a girl gets 25 cents a week for pocket money and spends 20 cents, how much does she save in a year?	2.60
50.	John did 10 examples on Monday, 7 on Tuesday, and 13 on Wednesday. How many did he do altogether?	30

Analogies Test

Write the following samples on the board:

work.....day, sleep.....what?
sky.....blue, grass.....what?
fish.....swims, man..... what?
iron.....heavy, cork.....what?

Explain that the first two words are connected or related in some way. The objects of this test is to find out and write the *one* word which bears the same relation to the third word as does the second to the first. Explain this by means of the samples and warn the pupils to write only the *one* word. Tell them that twenty-five items such as those on the board are to be given. When you are sure that all understand, proceed to the examination. Say deliberately "No. 51. vinegar ....sour, sugar....what?" Read once and once only. Allow eight seconds (8) and pass on to the next question and so forth.

	Answer or Acceptable Substitute
51. vinegar....sour, sugar....what?	sweet
52. girl....woman, boy....what?	man
53. gradual....sudden, evolution....what?	revolution
54. granary....wheat, library....what?	books (book)
55. century....100, decade....what?	10
56. clothes....tear, dishes....what?	break (crack, smash, chip)
57. heat....expansion, cause....what?	effect (result)
58. fire....heat, ice....what?	cold
59. superlative....comparative, best....what?	better
60. man....legs, carriage....what?	wheels
61. inch....minute, space....what?	time
62. water....liquid, ice....what?	solid
63. navy....sailors, army....what?	soldiers
64. thirsty....starving, water....what?	food
65. seeing....hearing, eyes....what?	ears
66. beginning....birth, ending....what?	death
67. baby....nurse, sheep....what?	shepherd
68. field....fence, picture....what?	frame (border)
69. park....gate, house....what?	door (portal)
70. puppy....dog, lamb....what?	sheep
71. sit....chair, sleep....what?	bed
72. tuberculosis....disease, baseball....what?	game (sport)
73. time....clock, temperature....what?	thermometer
74. book....author, statue....what?	sculptor
75. hill....high, valley....what?	low

Opposites Test

Write the following samples on the board:

short L	part . . . . . W
night . . . . . D	smooth . . . . . R
boy . . . . . G	sunny C

Explain to the pupils that they are going to be given twenty-five word problems like those on the board. They have to find the word that means the opposite and *begins with the letter given*. The word written must be the same part of speech as the word dictated; if the word read is an adjective, then the word written must be an adjective; if a noun, a noun; etc. Instruct the pupils that they write only the *one word*, the word that means the opposite and begins with the letter given.

Read the number of the question and the word and the letter distinctly and let 8 seconds elapse and then pass on to the next question. Tell the subjects not to get flurried. If one item is missed, let them draw a dash and wait for the next word.

		Answer or Acceptable Substitute	
76.	bad	G	good
77.	large	S	small
78.	normal	D	defective (deficient, deformed)
79.	friend	E	enemy
80.	enduring	T	temporary (transient, transitory)
81.	bottom	T	top
82.	assert	D	deny (dissent)
83.	up	D	down
84.	allow	R	refuse (reject)
85.	slow	F	fast
86.	sterile	F	fertile (fruitful)
87.	bitter	S	sweet
88.	theoretical	P	practical
89.	sharp	B	blunt
90.	failure	S	success
91.	modern	A	ancient (antique, archaic)
92.	war	P	peace
93.	ratify	V	veto
94.	strong	W	weak
95.	full	E	empty
96.	knowledge	I	ignorance
97.	seldom	O	often
98.	doubtful	S	sure
99.	solid	L	liquid
100.	gain	L	loss (lose)

Scoring

This test has been constructed so that it may readily be marked by the pupils. Instruct them to change papers, and then read out the an-

swers while the pupils score the questions right or wrong. The total number right is the final score.

VALIDITY

No direct validation against an adequate intelligence criterion, other than written group tests, has been attempted. The present examination has, however, been administered to over a thousand pupils from grades VI to XII, and its correlations with orthodox intelligence examinations such as the National and the Terman Group Test have been determined. These correlations are somewhat higher than those found with the original examination. They range from .55 to .90 for grade populations. The detailed statistical results for one group are appended. They were ob-

TABLE II. CORRELATIONS BETWEEN PARTS OF THE TEST AND TOTALS FOR UNSELECTED GRADE VIII. $N = 62$

	Information	Arithmetic	Analogies	Opposites	Totals	Terman
Information	...	.48	.60	.64	.87	.81
Arithmetic	.48	...	.19	.29	.52	.51
Analogies	.60	.19	...	.59	.77	.69
Opposites	.64	.29	.59	...	.79	.64
Totals	.87	.52	.77	.79	...	.87
Terman	.81	.51	.69	.64	.87	...

tained from an unselected population of 62 eighth-grade children who were given this present examination by the author two weeks after the Terman Group Intelligence Test had been administered by the school authorities. Table II not only indicates a high correlation between the Group Test without Blanks and the Terman Group Test, but it also indicates, if the Terman Test is taken as the criterion, that each part of the test is making its distinctive contribution to the effectiveness of the battery. No claim is made that on the average the correlation of this test with the Terman is 0.87; this value is certainly somewhat high, if we may judge by similar correlations among other tests. The intercorrelations between repetitions of this test a week apart in unselected grade-VIII populations vary but slightly around 0.84.

Standardization

The test in its present form has not been given on a sufficient scale to establish reliable norms for the various grade levels, but the following tentative grade and age norms, based on 652 cases, may be employed without great error. These are arranged according to the levels of achievement of the various grades,[5] and are presented in Table III.

TABLE III. NORMS FOR GROUP TEST WITHOUT BLANKS
$N = 652$

Standards of Achievements of Various Levels of Grades (Midyear smoothed)							Mental Age	Score
Descriptive term	Level	Percentile	VI	VII	VIII	IX		
Indeterminate...	9+							
Highest.....	9	95	58	62	70	80	10	16
Very high.....	8	88	53	58	66	76	11	23
High.....	7	79	48	53	62	72	12	32
Medium high...	6	66	43	49	58	68	13	41
Median.....	5	50	38	45	54	64	14	51
Medium low....	4	34	33	40	49	60	15	60
Low.....	3	26	28	34	43	54	16	69
Very low.....	2	12	24	29	38	47	17	76
Lowest.....	1	5	20	25	34	42	18	83
Indeterminate...	−1							

The author would be extremely interested to receive from anyone using this test on a fairly large scale results which might further its standardization or indicate its exact degree of validity.

[5] Chapman, J. Crosby, "Convenience and Uniformity in Reporting Norms for School Tests," *Journal of Educational Research*, 5:406-20, May, 1922.

COMPARATIVE COSTS OF PLATOON AND NON-PLATOON SCHOOL ORGANIZATIONS

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During the past six years Detroit has been actively engaged in transforming its elementary schools from the traditional type to the platoon type of organization. The platoon school was not introduced as a measure of economy or as a means of relieving overcrowded conditions, but rather because it was considered a better kind of school. Nevertheless, the question of the comparative costs of the old and new organizations has been frequently raised.

In comparing costs, the two most important factors to be considered are the cost of the building and the equipment and the cost of instruction. A study of the cost of buildings leads to a consideration of (1) the per-pupil cost of new buildings erected specifically for the platoon schools; (2) the cost of additions to existing buildings as related to the per-pupil capacity under each type of organization; and (3) the possible pupil capacity of existing buildings (without additions) in relation to the old and new organizations. A study of the cost of instruction involves a comparison of the amount of teacher service required to carry on the work in the two types of schools.

The development of the platoon organization in Detroit has paralleled largely the construction of new buildings and the building of additions to others already in use. Recently, however, parents in districts where the buildings are not of the modern type have demanded the platoon organization. After consideration, a modified platoon program was arranged for such schools and the new organization was installed in a number of the older buildings. In all of these older schools placed on the platoon basis, the effect of the organization upon the pupil capacity and the cost of teacher service was studied.

The diagrams included in this article show the floor plans of several buildings and indicate how the space was utilized

before and immediately after their reorganization as platoon schools. The tables accompanying each diagram show the number and classification of teachers employed in these buildings before and after the schools were reorganized.

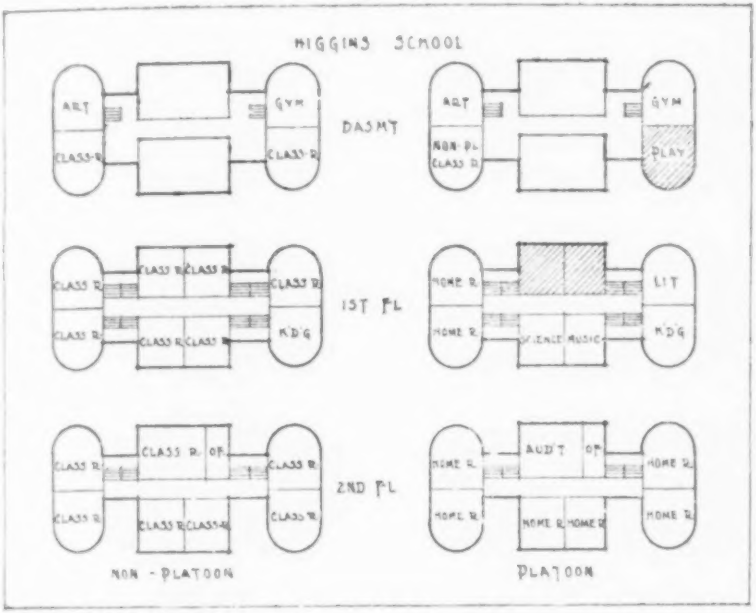

FIGURE 1.—FLOOR PLANS OF HIGGINS SCHOOL UNDER PLATOON AND NON-PLATOON ORGANIZATIONS

Higgins School

The Higgins School is an old brick structure erected in 1895. Before reorganization, the basement included a playroom or gymnasium, an art room, and two regular classrooms. Its actual capacity was sixteen classrooms seating a maximum of 40 pupils, and a kindergarten with a capacity of 60 pupils making a net capacity of 700 pupils ($16 \times 40 = 640$; $640 + 60 = 700$).

This building was remodelled to serve as a sixteen-section platoon school with one primary class and the kindergarten room outside of the platoon organization. The space distribution after

reorganization is indicated in Figure 1. The art room and gymnasium remained in the basement, one of the classrooms was retained for play purposes on inclement days, and another room was utilized for a primary class not in the platoon organization. On the first floor two rooms were used as home rooms; one, as a literature room; one, for science; and one, for music. The

TABLE I. HIGGINS SCHOOL UNDER NON-PLATOON AND PLATOON ORGANIZATIONS

Non-Platoon		Platoon	
Pupils I-B—VI-A	651	Pupils I-B—VI-A (16 Sec. +1)	703
Grade-room teachers	16	Home-room teachers	8+1
		Penmanship teachers	1
Art teachers	1	Auditorium teachers	2
		Health teachers	2
Music teachers	.8	Literature teachers	1.5
		Social-science teachers	1.5
Health teachers	1	Music teachers	1
		Art teachers	1
Manual-arts teachers	.45	Manual-arts teachers	.4
Total teachers for grade membership	19.25	Total teachers for grade membership	19.4

kindergarten was retained, and the other two rooms on this floor were vacated as shown by cross lines in the diagram.

The second floor included six home rooms and one room used as an auditorium. The building provided space for a sixteen-section platoon school (16×40) with a capacity of 640 pupils and in addition one room which would accommodate 40 pupils outside the platoon system, a kindergarten providing for 60 pupils and two rooms with a capacity of 80 made vacant by the change of organization. This made a total of 820 ($640 + 40 + 60 + 80 = 820$) as compared with a capacity of 700 under the regular organization. This increase of 120 pupils equals the capacity of three schoolrooms. Since schoolrooms cost in Detroit from $12,000 to $15,000 each, this means a fair saving in building cost.

Reference to Table I will reveal other interesting data arising from the reorganization of the Higgins School. It shows that as a non-platoon school the building enrolled 651 pupils who were taught by 19.25 teachers. After it became a platoon school, the enrollment increased to 703 and the number of teachers remained practically the same. The platoon school also furnished a six-hour day instead of the five-and-a-half-hour day of the usual elementary school. The change in organization resulted

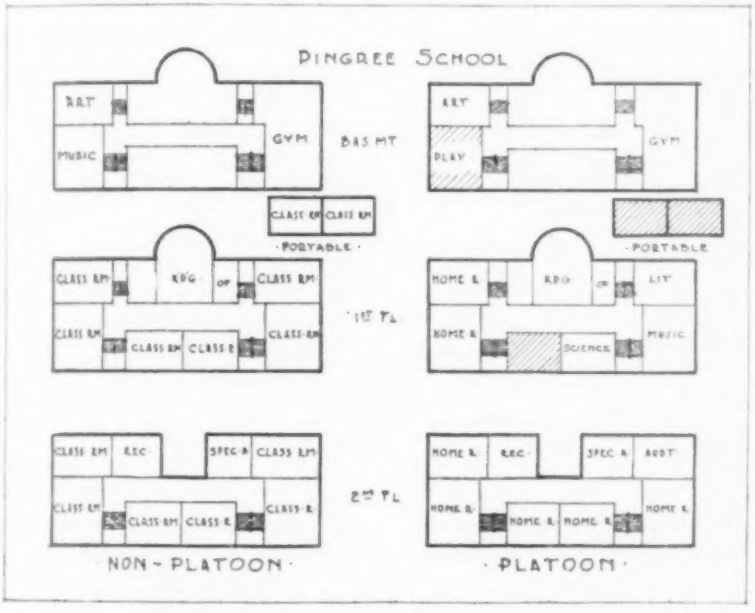

FIGURE 2.—FLOOR PLANS OF PINGREE SCHOOL UNDER PLATOON AND NON-PLATOON ORGANIZATIONS

in an increase in the capacity of the building, the provision for a longer school day with more pupil-hours of instruction, and an increase in the enrollment without increasing the required number of teachers. The practice is, however, in the platoon organization to pay one health teacher and two auditorium teachers $20 more per month than is allowed by the elementary-school schedule.

Pingree School

The Pingree School erected in 1900 was also made a platoon school. At the time the school was reorganized the building was so crowded that a two-room temporary or portable structure was required to supplement the seating capacity of the building. Reference to Figure 2 and Table II will show, that after reorganization, the two portables were no longer necessary and that one room in the main building was vacant. In addition one basement room was not used except for play

TABLE II. PINGREE SCHOOL UNDER NON-PLATOON AND PLATOON ORGANIZATIONS

Non-Platoon		Platoon	
Pupils I-B—VI-A	651	Pupils I-B—VI-A (14 Sec.)	661
		Home-room teachers	7
Grade-room teachers	14	Penmanship teachers	1
		Auditorium teachers	1
Art teachers	1	Health teachers	2
		Literature teachers	1.5
Music teachers	1	Social-science teachers	1.5
		Music teachers	1
Health teachers	1	Art teachers	1
Manual-arts teachers	.4	Manual-arts teachers	.4
Total teachers for grade membership	17.4	Total teachers for grade membership	16.4

on days when it was impossible to send play classes out of doors. Table II shows that 661 pupils were given a six-hour day under the platoon plan with one less teacher than was required under the regular organization. Here again there was a distinct saving in housing capacity. There was also a saving in the cost of teacher service.

Smith School

The Smith School erected in 1903 was similarly reorganized. For a number of years the Detroit school authorities have tried to abandon the use of basement rooms for regular class purposes. Figure 3 shows how this was done by the introduction of the

platoon organization in the Smith School. By the change all basement rooms save one which is used occasionally for play were vacated. In this instance instead of adding a capacity of three rooms by reorganization a different result was attained, namely three undesirable rooms were closed and the same number of pupils were housed in the remainder of the building, while, at the same time more hours on instruction were provided.

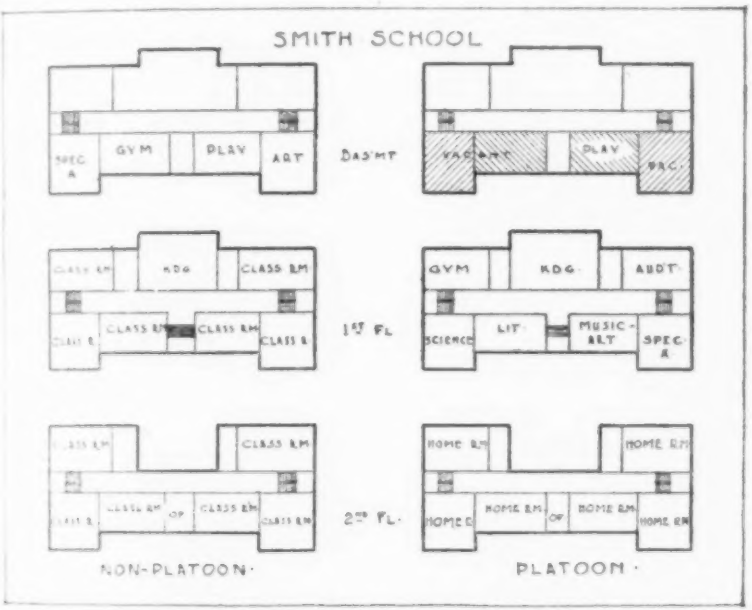

FIGURE 3.—FLOOR PLANS OF SMITH SCHOOL UNDER PLATOON AND NON-PLATOON ORGANIZATIONS

Moreover, this result was secured with one less teacher than was employed for the same number of pupils under the non-platoon organization.

Instances of this kind might be multiplied, but all of them would point to the fact that even the old and more or less out-of-date buildings are not being efficiently used when the traditional elementary organization is employed. Neither new buildings nor elaborate changes in old ones are necessary to permit the more effective use of the school plant.

There are many towns and villages in which the platoon organization cannot be introduced unless the old buildings can be utilized. This brief study shows that such plants can be used

TABLE III. SMITH SCHOOL UNDER NON-PLATOON AND PLATOON ORGANIZATIONS

Non-Platoon		Platoon	
Pupils I-B—VI-A	572	Pupils I-B—VI-A (12 Sec.)	576
		Home-room teachers	6
Grade-room teachers	12	Penmanship teachers	1
		Auditorium teachers	1
Art teachers	.4	Health teachers	2
		Literature teachers	1
Music teachers	.6	Science teachers	1
		Music teachers	.6
Health teachers	1	Art teachers	.5
		Manual-arts teachers	.1
Manual-arts teachers	.3		
Total teachers for grade membership	14.3	Total teachers for grade membership	13.2

and that at the same time the building capacity and the number of pupil hours of instruction may be increased without additions to the cost of teacher service.

READING DIFFICULTIES IN ARITHMETICAL COMPUTATION

W. E. LESSENGER
State University of Iowa

Arithmetical computation, although seemingly farther divorced from reading than from the solution of verbal problems, does involve certain specific skills in the field of reading. In connection with an extensive study of special instruction and motivation in reading, the writer was brought face to face with certain striking facts concerning the rôle of reading as a factor in success in solving examples in arithmetic.

During the school year, 1923-24, a study of achievement-quotient technique was conducted in the public schools of Radcliff, Iowa, under the direction of Professors Ruch and Horn of the State University of Iowa. But part of this study is reported here. During this investigation emphasis was placed upon instruction in reading, but no variation from the typical programs for arithmetic or any other school subject was permitted. During the third week in September the Stanford Achievement Test, Form A, was administered to all the pupils from the third to the eighth grades, inclusive. At the end of the first semester Form B of this test was given, and at the end of the second semester Form A was repeated. Since a period of eight and one-half months separated the two testings by Form A, the direct "carry-over" of familiarity or practice effects was, in all probability, negligible.

When checking the results of these tests, the writer was struck by the fact that the pupils' gains in arithmetical computation were as great or greater than those in reading, although reading had received additional motivation and instruction. Roughly speaking, gains of one and one-half to more than two years were scored in computation. This fact suggested the value of a detailed study of the errors made by the pupils on the initial and final testings. A considerable proportion of the actual errors

were found to be the direct result of misreading the directions for the examples. Since the arithmetical computation test of the Stanford Achievement Test is of a mixed-fundamental type, the careless pupil frequently solved examples by some operation other than the one specified on the printed sheet. Such errors may arise from carelessness, unfamiliarity with the vocabulary or symbols of arithmetic, perseverations of mental set from the preceding example, and the like. Although a child may sometimes consciously avoid the instructions in order to choose an easier method of solution, this seems very unlikely.

TABLE I. THE ARITHMETICAL COMPUTATION SCORES OF ONE HUNDRED AND ELEVEN PUPILS IN THE INITIAL (FALL) AND FINAL (SPRING) TESTING, EXPRESSED AS ARITHMETIC AGES

	Arithmetic Age	
	Initial Testing (Months)	Final Testing (Months)
Mean arithmetic age (actual)	138.5	165.3
Mean theoretical arithmetic age	144.6	166.0
Mean loss due to faulty reading	6.1	0.7

The directions for the separate examples of the Stanford Achievement Test are in some cases given in words—multiplication, subtraction, etc.—and in others by the signs for the operations. In Table I is presented a summary of the results of the fall testing. The expression, *Theoretical arithmetic age*, is but a name for a device used to portray in a rough way the effects of faulty reading; namely, this age was computed by allowing the pupil full credit for all examples solved correctly regardless of whether the operation actually used was the one called for in the printed instructions or not. If the pupil subtracted correctly when the example called for addition, credit was given. No credit was allowed, however, if errors in computation were made. *Faulty reading* is the term used to include all cases of misreading. The results in Table I involve the assumption that each example

misread, but solved correctly, would have been solved correctly had the printed operation been heeded. Such an assumption would be far from the truth if the pupils followed some systematic tendency toward a selection of an easier operation, but investigation of the test papers failed to reveal the evidence of any such tendency. From Table I, therefore, it appears that on the *Initial testing* the average pupil was penalized approximately six months because of faulty reading. The effects of the year's intensive training in reading are shown by the second column, *Final testing*, where the *Mean loss due to faulty reading* is but seven-tenths months.

TABLE II. THE GAINS IN ARITHMETIC-COMPUTATION AGE MADE BY SIXTY-SEVEN POOR READERS

	Months
Mean loss in arithmetic age by faulty reading, fall tests	10.1
Mean loss in arithmetic age by faulty reading, spring tests	1.0
Mean gain due to improvement in reading	9.1

The gains in arithmetic due to the training in reading are large enough to be statistically significant, and the conclusion that specific training in the reading of the instructions for the solution of examples would eliminate almost completely errors of the type under discussion seems to be incontrovertible. In fact, the errors due to faulty reading virtually disappeared as a result of training in reading *without any specific reference to arithmetic.* The transfer of the improved skills from reading proper to reading in arithmetic was extensive. The desirability of specific training in the reading of signs which show the operation to be used and instruction in arithmetical computation is clearly indicated. The actual skills in reading which were emphasized during the period of this study included the ability to focus attention upon key words and on technical signs, the ability to focus combinations in one eye-pause, to read unimportant parts hurriedly, etc.

Table II shows the results obtained in the fall testing after the elimination of forty-four pupils who made no errors due to faulty reading. The effects of the reading training are even more

significant in the case of the remaining sixty-seven pupils who were the poorest readers.

Table III shows a comparison of the gains in arithmetical computation of the sixty-seven poor readers and the forty-four good readers, classified upon the basis of the fall tests.

TABLE III. COMPARISON OF THE GAINS IN ARITHMETICAL COMPUTATION MADE BY SIXTY-SEVEN POOR READERS AND FORTY-FOUR GOOD READERS

	Months
Mean gain in arithmetic age of 67 poor readers	29.7
Mean gain in arithmetic age of 44 good readers	21.2
Excess of gain of poor readers over good readers	8.5

The poor readers, at the outset, gained 8.5 months more than the good readers, but, 9.1 months (Table II) of this gain was not a real gain in arithmetic but was due to improvement in reading skills involved in arithmetical computation. When allowance is made for this fact, the real gains in computational ability are almost exactly equal for the two groups.

It is interesting to note that W. K. Wilson, in an arithmetic survey at Vinton and Rutland, Ohio, found similar results from the use of the Woody-McCall Mixed Fundamental Arithmetic Tests. He reaches the conclusion, however, that the Woody-McCall test is at fault, saying: "The writer believes that the weakness is in the test; he feels that such a scrambled mass of problems is likely to cause confusion, and that the single direction-word is inadequate."[1]

The present writer cannot agree with this conclusion for several reasons. The mixed fundamental type of test in arithmetic has proved to be of conspicuous merit for purposes of general measurement and for economic surveys of pupils' abilities. The real difficulty lies elsewhere. Two factors at least contribute to the explanation of failures of pupils on mixed fundamental tests due to slovenly reading: (1) the very unfortunate practice of many textbooks—particularly the older ones—of "bunching" the

[1] "The Woody-McCall Arithmetic Test as a Test in Reading." *Educational Research Bulletin*, 3:329, November 12, 1924.

practices on isolated operations, and (2) the lack of provision in our textbooks for specific training in the reading and the meaning of the vocabulary and symbols in arithmetic. In real life arithmetic is most often of the mixed-fundamental sort rather than segregated operations. Textbooks and teaching should follow the dictates of social utility here. Surely no one would argue that pupils should *not* be trained to turn quickly from addition to multiplication and from division to subtraction without interference from mental sets and perseverating tendencies, nor is it any more reasonable to condemn a test because it permits pupils to read "sloppily." Against such a criticism may be set the advantage that such a test actually portrays weaknesses in our teaching of arithmetical skills which an isolated-function test is bound to hide beyond discovery.

Moreover, convincing evidence has been presented on the foregoing pages that the difficulty virtually disappears when attention is given to the reading aspects of arithmetic. Roughly 40 percent of our pupils were totally free from errors due to faulty reading and the remaining 60 percent were practically cured in nine months by skillful training in reading without any additional training on the reading skills in arithmetic proper. Viewed more broadly, the faults ascribed to the mixed-fundamental type of arithmetic tests might quite as validly be turned into arguments for the greater diagnostic power of such tests in comparison with the separate-function type which seems to be less defensible from the standpoint of social utility. At any rate the important thing is the discovery of this source of error and its cure.

Editorials

SPEED AND ACCURACY

It is certain that a number of popular tests unduly emphasize the value of speed. When the success of pupils working under a time limit is recorded in "attempts" and "rights," the meaning is, of course, that the number of items attempted is a measure of achievement. Thus it comes about that speed is thought of as having an independent value, as being a substitute for accuracy, and as something which may stand in its stead.

Nothing could be further from the truth. We are not interested in how rapidly a child can get something wrong. We recall the remark of Superintendent McAndrew when, as a result of the New York City survey it was ascertained that the New York children had greater speed but less accuracy in arithmetic than children in general. McAndrew—who at that time was an associate superintendent in New York—explained the meaning of this by saying that it took the New York children less time to get a thing wrong than it did the children of the rest of the country.

As a matter of fact speed in human affairs has no independent existence as a worthy objective. Of course, we have trials of speed; and in such matters as athletics speed may appear to have an intrinsic merit.

Even here, however, the ultimate value of speed is undoubtedly to be interpreted in terms of the purpose for which speed is used. But leaving athletics out of account what, we may ask, is the value of speed in typewriting contests, or in laying bricks, or in filing letters? Is not the very idea of speed in these instances speed *with* accuracy? Mere speed on the typewriter wins no contests. The rate at which bricks may be imbedded in mortar without reference to alignment or pattern is of no consequence. The number of letters that can be filed in an hour is only of interest on the assumption that the letters are filed correctly.

We do not for a moment underestimate the value of speed nor the bearing which facility, fluency, or productivity has upon

achievement. But one may be too facile. One may produce too much. If quality is not maintained all one's output may be of small value. It may even be of less value the greater it is in amount.

There are conditions under which speed has almost no value at all. It has no place, for example, in the canons of literary criticism. The rate at which Wordsworth composed "Tintern Abbey" is never considered. Whether Coleridge turned out "Kubla Khan" more rapidly, line for line, than Shelley did "Adonais" is too absurdly unimportant to merit attention. Who cares whether Newton's formulation of the laws of attraction was a slow process or a flash of inspiration? Whether Phidias or Cellini or Velasquez was a "quantity producer" arouses no interest. The power of Da Vinci's "Last Supper," the splendor of the Sistine Chapel, the miracle of the Cologne Cathedral would be in no wise increased had they been produced in half the time.

We are quite sure that among the most important things we can do in the schools is to teach children and young people how to think. There are those who regard the course of study mainly as material on which thinking may be based. There is much to be said for this point of view. Speed is about the last thing one wants in a classroom where thinking is desired and expected. We have too many snap judgments not only in the classroom, but also in the outside world. We all know and strive to restrain the pupil or the student who blurts out an answer to a thought question before he or anyone else could possibly have seen the bearings of the matter or devoted the least quantum of thinking to it.

Let us give speed its proper place in our testing and in our appraisal of school conditions. It has undoubted value but its value is not primary but secondary, not fundamental but derived. Its merit as a possession comes only after certain standard quality of performance has been attained. Speed of reading is a symptom of good reading only when a useful degree of comprehension has been reached. The speed with which columns of figures can be added will impress no one, least of all the business man, unless the most exacting standard of accuracy is united with it. The rate at which we can make decisions, or drive an automobile, or write an editorial is vastly less important than the excellence of our execution.

Reviews and Abstracts

MacPhail, Andrew H. *The Intelligence of College Students.* Baltimore, Warwick and York, 1924. 176 pp.

This book presents a study of intelligence as a factor in the selection, retention, and guidance of college students. The first part of the book is a survey of current practice and of results in the use of intelligence tests in many different institutions of higher learning. The second part of the book is a study of the criteria of admission and retention of students at Brown University with special attention to intelligence tests.

The survey of intelligence-test uses and results indicates that colleges and universities are using such tests for many purposes. They are particularly interested in the possibility of using the ratings for determining the admission of students to college and for predicting academic success in college. The results in schools where these problems have been investigated lead to the conclusion that considering each criterion for prediction and admission taken alone and strictly on its own merits the order of validity from the most valid to the least valid seems to be (1) intelligence tests, (2) high-school records, (3) comprehensive examinations, and (4) content examinations (old type). It should be noted, however, that in practically every case the intelligence test is not regarded as sufficiently accurate to be used as the sole criterion for the prediction of academic success or for admission to or exclusion from college. When coupled with information of the more usual sort, however, the combination affords a far better prognostic criterion than has hitherto been available.

The description of the administration of intelligence tests and the studies of results obtained at Brown University contain suggestions as to means and methods of procedure which are of value to any college or university which is attempting to meet the problems of selection and guidance of students. Several of the more significant conclusions with respect to the use of such tests at Brown University are: (1) Psychological test scores are considerably superior to either the high-school principals' estimates or rank in high-school class in predicting the degree of a student's success or failure in college during his first semester. (2) Students who leave college for any and all reasons are as a group intellectually inferior to the rank and file of students, while those dismissed from college show a more marked inferiority. (3) A student should not be denied admission to college merely on the basis of a low psychological-test score, but on the other hand a low psychological score coupled with poor academic work for the first semester would appear to be a reasonably just criterion for dismissing a student from college at that time.

It is recognized that the intelligence test has not been entirely satisfactory as an instrument for predicting academic success. Many factors other than intelligence enter in to determine this success. It is necessary to find these factors and by the method of multiple correlation or multiple ratio correlation to increase the accuracy of the prediction which can be made.

C. E. ERFFMEYER

North-Western College, Naperville, Illinois

MINOR, RUBY. *Principles of Teaching Practically Applied.* Boston, Houghton Mifflin Company, 1924. 281 pp.

All too frequently the elementary-school teacher, eager to profit by recent advances in educational theory, fearing that much of the adverse criticism of school procedure is valid, in sympathetic agreement with the larger purposes of the more progressive theorists, comes away from the lecture rooms of the summer schools or from the recommended volumes on the Reading Lists, ardently wishing to realize in her own schoolroom the visions that she has seen. Unfortunately she sometimes finds herself unable to translate these inspirations into the actual practices of the day's work of a group of children studying a lot of subjects. All too frequently the ardor burns itself down to wishful thinking, or perhaps to a bit of timid experimenting with superficial changes in this or that technique, and spells failure.

Now there comes a book in the series of the "Riverside Textbooks in Education"—*Principles of Teaching Practically Applied*—by Ruby Minor, done for teachers by a teacher. With an insight rare indeed into the manifold problems of the schoolroom, she resolves them into their elements very simply and very clearly, so that the classroom teacher may recognize the principles of teaching involved, and analyze her own procedure to evaluate her own applications of these fundamentals.

In the brief span of less than three hundred pages there is not much room for elaboration, but one closes the book with a sense of clarity of understanding of the points taken up, whatever may have been omitted. This is due primarily to Miss Minor's organization of her presentation and to the happy aptness of the practical applications of her principles which she draws discriminately from her wide experience as an analytical and inspiring supervisor of teaching.

In tone the book is didactic and positive; it bristles with "the teacher should" and "the teacher must," but is pervaded with the deepest respect for the teacher in the classroom as a significant element in the progress of society, whose aims and purposes must primarily be clear to herself.

The seventeen chapter headings are suggestive of the practical character of the book. Each chapter closes with a summary of the "Educational Principles Involved in the Foregoing Discussion," admirably adapted to clarify a teacher's analysis of her own procedure in that field. There follow then "Problems for Investigation and Discussion," suggestive to the individual student, and offering a program for study or debate by groups or circles organized to that end; and finally there is for each chapter a list of "Refer-

ences for Collateral Reading." The whole is compact with help for any teacher who will study it, and should prove invaluable to those who are unfortunately remote from centers of inspirational help or are without the support of skilled supervision, as well as to the many who know how hard it is to be sure that the activities of a classroom, seen in terms of a variety of children and a list of subjects on a program, are conforming to principles of too often vague definition.

As the author notes in the Preface, she "does not claim originality for the principles defined." Indeed, there is nothing new or revolutionary, but the book leaves no doubt as to the truth of such ideas as these: "Securing purposeful activity on the part of pupils is an essential of successful teaching"; "A desirable type of interest can be secured only when school work is related to the life of the child"; "If the goal is sufficiently desirable, he will labor with an unbelievable amount of endurance to accomplish his purpose"; "To give the child things to do; to help him to find things to do with; to lead him into larger fields of endeavor, and to assist in making work satisfying, are principles which aid in securing the kind of attention and interest which leads to purposeful activity."

One reads "there is fallacy in dividing lessons into types, if by so doing the teacher becomes confused into thinking that any such mechanical division can be practiced in the schoolroom." There follow then pages on "The Development Lesson," "The Review Lesson," "The Drill Lesson," "The Lesson for Appreciation," "The Project Method of Teaching," and "Project Teaching Illustrated"—chapters that may not be replete with novelties, but which will impress any teacher, strong or weak, experienced or untried, as being full of good sense, of definite purposes, bristling with practical advices, and so well organized to the author's purpose that it is scarcely possible for the reader to fail to catch not only her meaning but her method.

The book is itself an excellent bit of teaching of the sort it aims to induce teachers to put into practice.

L. R. ERNST

St. Louis, Mo.

CROW, CHARLES S. *Evaluation of English Literature in the High School.* New York, Teachers College, Columbia University, 1924. 172 pp. (Teachers College, Columbia University, Contributions to Education, No. 141.)

It is no penchant for being flippant which leads me to say that the tune to which the English classics are generally taught is, "We don't know where we're going, but we're on our way." To be more elegant, we have too confidently assumed that all our aims, high and many, are being inscrutably realized by all the classics. The purpose served by a given text has always been a matter of opinion.

Dr. Crow's study, which tests and arranges seventy-four classics in accordance with the pupils' judgment of their values "given in terms of ends that are generally recognized as socially valuable," points the way to a much desired reorganization of the English literature course in high school.

The study is based upon data collected from 2,000 pupils in twenty-seven schools in seven states. Each pupil assigned to each classic, whether "studied intensively or simply read," a value on each of four scales. Each scale is divided into two parts, a positive side having this title (Scale 1): "Interesting, entertaining, excellent book for my leisure time," with degrees representing "very," "considerably," "a little"; and a negative side bearing the title: "tiresome," "irksome for me," with the degrees previously mentioned. Scales 2-4 bore the titles: "inspiring," "artistic," "desirable," respectively, each with brief explanatory statements on both sides.

In his summary chapter the author discusses the influence of the following factors upon the realization of the four social values set up in this study: (1) To what extent are the goals represented in these scales being realized through the seventy-four classics, and which classics are best suited for their realization? (2) What is the influence of sex? (3) Which gives the better results in the teaching of these classics, intensive study or cursory reading? (4) What is the influence of "difficult" to read and study? (5) What are the influences of age, of expecting to go to college, and of expecting to teach?

The reliability of the data was carefully checked by having each pupil indicate that his judgment was (1) "true to the best of his knowledge and ability;" (2) "partly true and part merely guesses;" (3) "mostly guesses;" and by second ratings. The care with which the study was made justifies confidence in the validity of its conclusions.

The author feels that the chief value of his study lies not in the general answers to his problems, "but rather in the specific answers given" with respect to each title. Those who still insist that what is good for the pupil is not what he likes, but what he ought to like, may not attach much significance to Dr. Crow's findings. I suggest that all such scrutinize the scale on page 77 showing how boys and girls arranged the classics in order of aesthetic value. It is to be questioned if the Forty Immortals after an all-night session could have done any better. Many will agree with the reviewer in the opinion that Dr. Crow has made a genuine contribution to the teaching of English, and that we shall know our business the better for his work.

H. Ward McGraw

Head of the Department of English, Plattsburg High School

Stedman, Lulu M. *Education of Gifted Children.* Yonkers-on-Hudson, World Book Company, 1924. 190 pp.

This book grew out of the author's five years experience in charge of the "opportunity room" in the training school at the Southern Branch University of California. She gives us the history of the organization of that room; a rather detailed account of the nature of the instruction given; sixteen case studies of gifted children from its membership, including a child "possessing the highest intelligence quotient yet reported" (214); the educational profiles and achievement quotients of these same children, showing the relationship between their measures of intelligence and school attainment; and samples of their group projects and activities, including original dramatizations, tunes

addresses, poems, and descriptive writings. The book ends with a chapter devoted to summary and conclusions with a list of nineteen recommendations for curriculum enrichment, and the suggestion of a number of lines for co-operative study in this field.

The question of the kind of curriculum that should be arranged for the gifted child is one which is occupying the minds of many administrators and teachers, especially those who are in charge of special rooms for children. There are already many such rooms in existence, and the number is steadily increasing. There is no question, therefore, of the timeliness of such a book, but its value is to be measured largely by the practical and specific advice concerning the schoolroom treatment of highly gifted pupils which it affords. As is the case with most of the books that have appeared in this field, this one, too, is more valuable for what it suggests to the teacher in charge of gifted children, than for any definite prescription it makes. For the teacher, the most important and practical part consists of the suggestions for curriculum enrichment, found in the last chapter. Most of these suggestions support Freeman's contention that enrichment is after all only another name for acceleration, for the enrichment suggested consists in exposing the gifted child to material and methods which would be two or three grades or more beyond him, were he normal for his chronological age. It must be admitted, that the great majority of them would apply to the education of the ordinary child just as advantageously as to that of the gifted.

As a whole this book is very much worth while, but to the reviewer it seems padded in places. Much material in the main text might better have been relegated to footnotes, for example whole paragraphs consisting of the names of persons who assisted in giving and scoring the various tests which were used in the study; even the names of those who checked the results are included. No doubt, these are important enough in the eyes of the author, but the average reader will not be greatly interested in them. Is it not about time that we may be allowed to take for granted that the directions for giving and scoring the various tests have been faithfully followed, and thus relieve investigators of reiterating the statement in reporting their work, as the present author does!

Some readers will believe that more samples of the written work done by these pupils are included than are necessary. In particular, a better case might have been made had the number of "poems" been greatly reduced. It is only fair to state, however, that these are introduced in an apologetic way, and that merit is claimed for only two or three of them.

These are minor matters, and such criticism is only carping. Miss Stedman has given us a timely, suggestive, and valuable piece of work, which every one who is interested in the education of gifted children, from either the theoretical or practical point of view, will do well to read.

T. S. Henry

Western State Normal School, Kalamazoo, Michigan

MOSSMAN, LOIS C. *Changing Conceptions Relative to the Planning of Lessons.* New York, Teachers College, Columbia University, 1924. 72 pp. (Teachers College, Columbia University, Contributions to Education, No. 147.)

The problems involved in the training of teachers increase in recognized importance as educational procedures become more clearly defined. In looking forward to more adequate training every current practice presents a challenge. This discussion of lesson planning is, therefore, most timely, for the making of lesson plans has long been considered an essential part of teacher training.

The history of lesson planning closely follows the development of teacher training. Before 1860 little attention was given to the teacher's daily preparation except as review of subject-matter was necessary. Teaching was supposed to consist in the presentation of facts to be learned. With the development of object teaching, from 1860 to 1890, the question and answer type of lesson plan became common. Written lesson plans were required of student teachers. Eventually this procedure became so formalized that leaders began to search for a better type of plan.

The Herbartian movement receives very careful analysis because of the influence of the five formal steps upon lesson planning. The wide-spread influence of this movement is well shown, and an illuminating criticism of its weaknesses is given, especially of its tendency to formalism. The value of the lesson plan in assuring definiteness in the teacher's preparation is credited largely to this movement.

Present attitudes and practices were discovered by means of three questionnaires, which were sent to training schools, teachers in service, and administrators respectively. The returns indicate great divergence of attitude and of practice. Planning is, in general, approved, but there are strong tendencies toward the modification of the form. The situation, however, seems to resolve itself into the familiar one of attempting to pour new wine into old bottles.

In contrast with this condition a clear and interesting analysis is made of present theories of instruction, and suggestions are made for lesson planning which shall embody these theories. This section of the study should prove most helpful to those engaged in teacher training. To the extent that the individual student-teacher will be helped in her work with the children it is recommended that she be taught to plan with both large vision and essential detail. Growing out of the present tendency to vary procedures because of children's needs, the teacher is encouraged to jot down actual results. The plan thus grows to be a journal. Different types of class activity call for different types of plan. The psychology of learning and of behavior find practical applications here. Whoever has felt the inadequacy of the older types of lesson planning will rejoice that this clear exposition may lead the way to planning which will be purposeful, varied, and individualistic enough to prove its importance to every young teacher.

FRANCES JENKINS

University of Cincinnati

MOORE, CLYDE B. *Civic Education. Its Objectives and Methods for a Specific Case Group.* New York, Teachers College, Columbia University, 1924. 117 pp. (Teachers College, Columbia University, Contributions to Education, No. 151.)

This book aims to present a diagnosis of the civic education which a homogeneous group (the sons, twelve to fourteen years of age, of farmers who operate their own farms in the North Central States) is now receiving and on the basis of the results of this study to outline a specific course of study in civics.

The survey presented, however, turns out to be an excellent description, although it is derived quite largely from secondary sources and from what is evidently the author's general knowledge, of the social, economic, and educational conditions common to the rural population of the North Central States. On the basis of this information and in view of what appears to be the "civic shortages" in the education of the boys of the age stated, the author outlines the essentials of a course in civic education. It is divided into three sections. Section I is a text roughly similar to the best textbooks in civics used in city schools, but with an organization particularly adapted to the country boy's background and needs. Of the twenty-two chapters proposed, only the first two are included in the monograph. These chapters are designed to present not only the conventional "civics" material, but also such matters as "Good Health and Good Citizenship," "Achievement in Agriculture," "The Family and the Home," "Organizations Influencing Citizenship," etc., so as specifically to realize the objectives pertinent to the civic education of the "case group."

Section II consists of "authentic epitomes in the field of civics," which are short paragraphs upon a wide range of topics. Its purpose is to offset the lack of information supplied by rural-school libraries, and to stimulate the pupil's independent reading and reflection. The idea is splendid, but the haphazard selection given as an illustration of the plan reveals only too clearly the difficulties in the way of realization.

Section III of the proposed course is also distinctive, for it would include "lists of habits and skills which are fundamental to desirable civic and social life." It is planned on the supposition that the country boy does not receive an essential training in personal hygiene and that he requires special guidance in the way of establishing right relations with others. The subject-matter of this section would serve as an informational basis for establishing these individual and social habits. Consequently it becomes a handbook of information and direction regarding desired habits of personal hygiene, ways of promoting the well-being of others, safeguarding property, good manners, and habits of "civic power" in which are included some thirty habits, beginning with "Saluting the flag" and ending with "How to organize a movement for community welfare."

It goes without saying that this is a suggestive study, because it directs attention to the necessity of teaching civics in the broadest meaning of that term, and with special reference to the needs and conditions of the group one

teaches. As a "case-group" method, however, it is rather misleading. A "case group" which extends throughout the North Central States is homogeneous in only the most general respects. Consequently the "diagnosis" is nothing more than a broad description derived from other sources. And while the general lines of the proposed textbook in civics are well worked out they remain "general lines" and the net result of the study is little more than a suggestion.

V. T. THAYER

Ohio State University

RANDOLPH, EDGAR DUNNINGTON. *The Professional Treatment of Subject-Matter.* Baltimore, Maryland, Warwick and York, 1924. 196 pp.

Those who teach have a common problem. Variously it may be stated, or however specific may be its immediate intent, it still remains essentially the same, How can we, as teachers, help to transmute education into practice? In the education of those who are to become teachers the problem is doubly acute. In his recent book, *The Professional Treatment of Subject-Matter,* Edgar Dunnington Randolph shows how the problem has been attacked in our teacher-training institutions, on the one hand by those who have believed in the efficacy of academic education, and on the other by those who have entrenched themselves in the general elements of "method."

In the second chapter it is clearly shown how these diametrically opposed theories meet on the common ground of belief in education and the soundness of prior teaching, and how these two bases provided, during the three-quarters of a century of development to the present time, a groundwork for the professionalization of subject-matter. Whatever may be the impressions of the reader as he approaches Dr. Randolph's work he cannot but feel, after reading this section, a new respect, even awe, for the educational achievements in the early part of the nineteenth century. Dr. Randolph clearly shows by numerous references and enlightening comments how many problems confronting us today—problems all too easily thought of as "new"—were seen, appreciated, and discussed by these, our forefathers in education.

Turning to the present, Dr. Randolph makes a valuable analysis of the form and treatment of subject-matter courses in one hundred normal schools for 1921-22. He shows that "it is from the subject-matter position that the professional school for teachers is today shaping its instruction" and that "the major outcomes of three-quarters of a century of normal-school experience and discussion" have been that "the contrasting ideals of masterly scholarship" and of "professional fitness" have drawn "somewhat together, and both ideals survive on the merits of their relevancy to the teacher's needs." Here lies the crux of the author's contribution.

The remainder of the work consists in showing how the needs, (1) "familiarity with the materials to be taught," (2) "extensions as are most pertinent to the teacher's problems and the social purposes of education," and (3) "to make dynamic connections with the students' past achievements and present purposes," may all be met in three phases of subject-matter, geography, literature, and arithmetic.

Dr. Randolph's work is an illuminating presentation of present-day ideals in subject-matter. As such it deserves the careful attention of all who are responsible for the preparation of our future teacher, be they administrators or instructors.

CHARLES RUSSELL

University of Toledo

WILSON, HARRY B., KYTE, GEORGE C., AND LULL, HERBERT G. *Modern Methods in Teaching*—New York, Silver, Burdett and Company, 1924. 286 pp.

These authors have not attempted to make a contribution to educational literature, but they have furnished a helpful textbook for those who have not advanced far in their professional equipment. It sets up clearly defined objectives of modern education and then defends and advocates them with convincing arguments and illustrations. It proposes standards for evaluating school buildings and equipment, educational policies, and procedures. Sharp and emphatic contrast between what is right and what is wrong is effected by presenting bits of curricular material which are good and examples which are bad. Types of classroom practice which are motivated and vitalized are so contrasted with others which are spiritless and routine that the reader is impelled to accept the former and reject the latter. This method of treatment persists as the range of problems treated extends to include socialized school work, the problem method of learning, the appreciation lesson, the drill lesson, and so on through many of the schoolroom procedures which are now being challenged or proposed.

A few present-day educational writers present the perfectly obvious in language which may not be understood. The authors of *Modern Methods in Teaching* have attained a style which is simple, direct, and comprehensible.

C. S. MEEK

Toledo, Ohio

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Doctor E. J. Ashbaugh, Ohio State University, Columbus, Ohio.

Investigation of Nursing as a Professional Opportunity for Girls is the title of a bulletin prepared by Florence E. Blazier and published by the Bureau of Cooperative Research of Indiana University. Typical forms of nursing service, factors conditioning success, the education of the nurse, and the employment of nurses are the major phases of the problem given consideration.

William F. Russell, professor of education and associate director of the International Institute of Teachers College, Columbia University, was appointed Acting Director of the Institute of International Education during the absence of Dr. S. P. Duggan, who is participating in the school survey of the Philippine Islands.

A recent bulletin of the Bureau of Educational Research (Circular No. 30) of the University of Illinois is entitled, *The Evaluation and Improvement of School Buildings, Grounds, and Equipment*, by Charles W. Odell. Reference is made to a number of score cards for school buildings and present-day standards for a number of the main items of school buildings and grounds are considered.

The University of South Carolina has published a bulletin containing an outline and collation of material for the South Carolina High-School Debating League on the question of "The County Unit of School Administration." Those interested in this question whether as a topic for debate or as a matter of information will find that the bulletin contains an exceptionally valuable collection of material.

The fire-department inspector of Fresno, California, uses a score card in his inspection of the city schools. Fire drills and conditions of plant are scored under a number of subdivisions and point scores are indicated on the card under the general headings of exceptionally good, superior, average, inferior, and poor. The instructor checks the credit allowed for each item, and a carbon copy of the report is left with the principal of the school.

During the past year a series of lectures on the subject of the junior high school was given before school principals in Chicago by C. H. Judd, R. L.

Lyman, E. R. Breslich, R. M. Tryon, H. C. Morrison, E. T. Filbey, C. J. Pieper, W. C. Reavis, and J. F. Gonnelly. These lectures have recently been brought together in bulletin form. School superintendents interested in the fundamental theories regarding the junior high school and something of current practice will find this volume of exceptional worth.

The National Catholic Welfare Conference, at Washington, D. C., has devoted a recent bulletin (Education Bulletin, No. 4) to Private Schools and State Laws. The author, Mr. Lischka, who is research agent of Catholic education, has brought together in a most compact and convenient manner those portions of the state constitutions, school codes, and judicial decisions which bear directly upon the general status of private schools. The libraries of all institutions which train teachers should have a copy of this bulletin for reference.

The city of Baltimore has recently issued a course of study in English for junior and senior high schools. The course has been worked out by a committee of teachers working under the advice of Dr. Hosic of Teachers College. The aims are stated, the materials and activities suggested, results required are listed, and an experimental lesson plan for each semester in a junior high school and for each year of the senior high is given. The attention of our readers is particularly called to the item "Results Required." The inclusion of this item in the course of study in English should be of distinct assistance to both teachers and pupils.

The Iowa State Teachers College, Cedar Falls, has issued a bulletin on physical education for elementary schools. The volume contains an immense quantity of material: games; physical exercises; music for marches, dances, etc.; and directions for field meets. It is well illustrated with pictures and diagrams. The one difficulty which teachers may meet in using this bulletin will be the finding of material which will be appropriate for a specific purpose, although all the material is indexed. A schedule of its organization in its larger aspects would have been a distinct asset to the usability of the book.

The School Visitor, published by the Board of Education, Highland Park, Michigan, contains three pages of tax information which should be of especial interest to the school people of Michigan. A glance at the figures shows that the cities of Michigan face the same variabilities in school administration that other states face. For example, per capita wealth in Highland Park is $3,306.33, while Saginaw, W. S., has $995.33. Four cities, Boyne, Gladstone, Kalamazoo, and Herford, devote 62 percent of the total tax to schools, while Negaunee expends 20 percent. Lansing seems to be free from school-bond indebtedness, while the bonded indebtedness of Saginaw W. S., is 3.8 percent of the assessed valuation.

The December, 1924, number of the *Baltimore Bulletin of Education* contains the time allotment by grades and subjects for the elementary schools.

A classification of total time in grades I to VI shows that the three R's receive 55.08 percent; industrial arts, drawing, and music, 14.54; health, hygiene, and physical education, 13.50; other fundamental subjects, 13.3 percent; and opening exercises, 3.37. As is found almost universally, arithmetic receives more time in grades V to VIII than any other single subject. One may well ask whether it is more important than any other subject, inherently more difficult, or maintains its time-allotment schedule simply by force of tradition.

The State Department of Ohio has published a course of study in physical education and hygiene for use in schools of that state. It was prepared by Mr. C. B. Ulery, high-school supervisor, and Dr. R. G. Leland, chief of division of hygiene, under the requirements of a law passed by the last Legislature. The bulletin provides a curriculum in each of the grades with generous bibliographies and teaching helps. There is also an appendix containing height-weight-age tables, information which teachers should know regarding the communicable diseases, extensive questionnaire blank for the school-health survey, and suggestions concerning sex education.

Dr. Paul Monroe, director of International Institute, Teachers College, Columbia University, is director of a school survey authorized by the Legislature of the Philippine Islands. Dr. Tavera of Manila and Dr. Suzzalo, president of the University of Washington, are other members of the survey commission. The selection of educational experts was left to Dr. Monroe who has appointed Dr. Carter Alexander of the Research Staff, Educational Finance Inquiry, to have charge of the investigation of financial administration; Dr. J. F. Williams, professor at Teachers College, Columbia University, to investigate health and physical education; and Dr. Stephen P. Duggan, director of the Institute of International Education, Carnegie Foundation, to investigate universities, higher and private schools. Dr. George S. Counts of Yale University, Mrs. Mary E. Pennell, assistant superintendent of schools, Kansas City, Missouri, Dr. Frederick F. Bonser, Dr. H. O. Rugg, and Dr. Lester M. Eilson are also members of the survey commission.

Educational guidance has received a good deal of attention in educational literature during the last decade. Vocational guidance has been evolving a technique and a body of information for a considerably longer time. Professor John A. Kinneman of the State Normal School, West Chester, Pennsylvania, has presented a bulletin entitled, *A Study in Guidance among Normal-School Students,* in which certain facts relative to the characteristics of such students with the reasons for their entering teacher-training institutions have been clearly set forth. On the basis of 1,154 students, the following seem to stand out clearly: (1) The educational background of parents of normal-school students is limited, but the parents and friends have had much more influence than high-school teachers in determining the decision to teach. (2) These students *did not drift into normal school,* but they constitute a distinct group with distinct ambition. (3) Students tend to select their teaching group primarily because of fondness for children of the age in the group selected, and secondarily, because of a probable demand for teachers in that group.

The International Kindergarten Union will hold its annual convention in Los Angeles, July 8-11, and in anticipation of the arrival of delegates and visiting educators the California committee of the I. K. U. is preparing an especially attractive program. The western kindergarten and primary teachers believe that from an educator's point of view this convention will be of unusual interest because the California kindergartens and primary grades have broken away radically from stereotyped systems and have developed instructive experimental education to an interesting degree.

In the February issue of this Journal it was announced that Mr. M. G. Brumbaugh, former superintendent of schools in Philadelphia, was President of Summerland College, Batesville, South Carolina. We have been notified of a mistake in this announcement. Mr. Brumbaugh is not President of Summerland College, but is President of Juniata College, Huntingdon, Pennsylvania.

Professor B. W. DeBusk of the University of Oregon was recently elected director of the new Bureau of Educational Research in connection with the Portland city schools. Professor DeBusk is spending a part of his time in Portland and has undertaken a survey of the work of the city schools in arithmetic. The purpose is to develop remedial teaching.

Have you seen *The Educational Measurement Review*, a periodical "devoted to the humanizing of educational science"? "Humanizing" is used in the fine sense which James Harvey Robinson has lately brought to the attention of the world. The periodical is issued by the Southern California Educational Research Association and appears bi-monthly. The subscription price is $1.00 a year. The editor is Dr. J. Harold Williams who was until recently editor of the *Journal of Delinquency*. You ought to subscribe to the periodical. It attempts to epitomize and interpret the best writings on research topics. There is a real place, in our judgment, for such a review. We wish the new venture unbounded prosperity.

Professor W. W. Charters, now Professor of Education and Dean of the Graduate School at the University of Pittsburgh, has been appointed Professor of Education in the University of Chicago. He will take up his new duties with the beginning of the second term of the summer quarter.

Professor Charters is best known to us for his writings on methods of teaching and curriculum construction. He was for some years Dean of the School of Education of the University of Missouri. He afterward occupied a similar position in the University of Illinois. He will give courses at Chicago in curriculum construction and in the organization of personnel methods.

The School of Education of the College of the City of New York announces the establishment of a Bureau of High-School Service under the direction of Professor J. Carleton Bell. The purpose of this bureau is to assist teachers, heads of departments, and administrative officers of the high schools of New York City in the solution of their problems. Aid will be given in conducting intelligence tests, developing new tests, classifying pupils, devising

remedial treatment, and giving standardized tests in high-school subjects. Particular attention will be given to the problem of ascertaining pupils' needs and of adjusting instruction to these needs.

Silent Reading in New York Rural Schools by W. W. Coxe, chief of the Educational Measurements Bureau, is bulletin No. 798 of the University of the State of New York. This bulletin gives the results of certain achievement tests in the rural and village schools of that state for the school year 1922-23 together with the results on a questionnaire which involved the practice with respect to recitations per week, minutes per week devoted to the subject, text used by various schools, supplementary readers, and story books and magazines used in connection with the reading work. There is also a section devoted to suggestions for the teaching of silent reading and a selected bibliography on the subject.

Much information has been gathered in recent years on the relative physical condition of school children in rural and urban schools. Dr. Thomas D. Wood of Teachers College, Columbia University, recently published the following data:

	Rural	*City*
Eye defects	23	12
Defective teeth	48	33
Bad tonsils	26	16
Adenoids	23	12
Malnutrition	16	7

These facts, coupled with the following, raise the serious question as to whether the country is such a desirable place in which to raise children as it has sometimes been stated: average school period, rural, 137 days, urban, 184; illiteracy, rural 7.7 percent, urban, 4.4 percent; per capita expenditure for schools, rural $44, urban, $80.

Dr. C. W. Kimmins of the University of London reported an extensive investigation into the nature of the situations which are the cause of children's humor, at the meeting of the British Association for the Advancement of Science at Toronto. Thousands of funny stories and jokes were obtained from children in the schools of London in answer to the request to give an account of the funniest story they had ever read or heard, and of the joke which made them laugh the most. Particular types of funny stories were found to exert the greatest appeal at certain definite ages. The purely visual type makes greatest appeal to the younger children. Doctor Kimmins reported that there are certain striking sex differences, especially among children of the same chronological age, and some difference between English and American children.

The former staff members of the California Bureau of Research, under the direction of Dr. J. Harold Williams, have completed a comprehensive report on the findings of the bureau for the eight years of its existence, including data on 1,250 delinquent boys, representing consecutive entrants to Whittier State School during that period. The report also includes a study of

341 delinquent girls at the California School for Girls and another study of 467 boys at the Preston School of Industry. Special emphasis is placed on the results of psychological tests and the social case investigations. Several hundred homes and neighborhoods were especially studied.

The bureau, which has been engaged since 1915 in the study of juvenile delinquency, was suddenly discontinued on June 30, 1923, in consequence of the "efficiency and economy" program of Governor Richardson. Its publications, including the *Journal of Delinquency*, were also discontinued. The Bureau was a department of Whittier State School, but maintained branch laboratories in other institutions.

Mr. Ernest P. Branson, director of the Department of Research, Long Beach, California, has issued a mimeographed bulletin on "A Study of Credit Unit Costs of Teaching in Long Beach." Data are presented for each of the departments in the junior and senior high schools, and credit cost computed on the basis of the number of students who received final passing marks. It is the cost of producing a unit product of at least a minimum quality standard.

Two facts stand out prominently: (1) the great difference in credit cost among different departments, and (2) the difference in ratio of salary budget allotted to the departments and the proportion of total credits given in these respective departments. A single example will make clear the last point. Industrial arts receives 9.1 percent of the salary budget, and gives 5.6 percent of the credits issued by the school; while social science receives 8.3 percent of the salary budget, and issues 12.6 percent of the credits.

Dr. Gilbert E. Phillips who is connected both with the University of Sydney, Australia, and the Teachers College of Sydney has recently brought out a book entitled the *Measurement of General Ability*. It is essentially a revision and extension of the Binet-Simon scale for use in Australia. We think Dr. Phillips' introductory treatment of the question of intelligence is sane. It leans pretty heavily upon Spearman's two-factor theory, but if a person is going to subscribe to this theory—and worse theories have been subscribed to—then he is entitled to use it for all it is worth. There is well defined logic in the development of the book. After the chapter to which we have just referred, the author gives the customary details as to the subjects he used in the construction of the scale and the details he secured. Passing to theoretical questions again, he offers a chapter on validity and reliability and closes his general treatment with a chapter on the application of intelligence testing to school and class organization. The second part of the book presents the actual revision of the Binet-Simon scale for use in Australian schools.

A school-visiting directory has been compiled by E. D. Hellweg, which is based on the judgment of 175 superintendents scattered throughout the United States, who, upon invitation, listed in rank order cities which were outstanding in certain phases of education. This list will be of interest to administrators who from time to time find an opportunity to visit personally other systems than their own. Under the following headings are arranged in order of fre-

quency of votes the cities which stood highest in the judgment of other superintendents:

1. For efficiency of organization: Detroit, Denver, Cleveland, Oakland, Rochester, Des Moines, Berkeley, Kansas City, Springfield (Mass.), Louisville, Cincinnati, Pittsburgh, Omaha, Buffalo, El Paso, Framingham, East Orange, Montclair, Trenton, Akron, Toledo, Gary, Tacoma.
2. Instruction of cripples: Chicago, Cleveland, Newark.
3. Military training: Chicago, Cleveland, Newark, Washington, Boston, New York.
4. Playgrounds: Chicago, Oakland, Gary, Detroit, Milwaukee.
5. Visual instruction: Detroit, New York, Los Angeles, Berkeley, Chicago, Newark.

A fund known as the Julius and Rosa Sachs Endowment Fund representing a gift of $20,000 made to Professor and Mrs. Sachs on the occasion of their Golden Wedding in 1924 has been established at Teachers College, Columbia University, for the purpose of promoting by a series of prizes, the program of secondary education in the United States.

Everywhere throughout the country the many students who knew and loved Professor Sachs while he was in active duty at Teachers College will be interested in this unique use of a Golden Wedding gift.

The Sachs Endowment Fund offers a prize of $1,000 payable in June, 1926, for the best essay or treatise on the following topic: "The Promotion of Scholarship in the Teachers of the Secondary Schools of the United States."

Copies of the announcement and the rules governing the submission of manuscript in competition for this prize may be secured by applying to Dean James E. Russell, Teachers College, 525 W. 120th Street, New York City.

Methods of Educational Research

Interest in educational research has increased a great deal within the last fifteen years. Research bureaus have been established in many of our universities and also in some of the normal schools. Several different methods have been used and much has been said about the characteristics and abilities that should be possessed by the research worker. The five different methods used in educational research with perhaps some overlapping are experimentation, investigation, tests and scales, history, and compilation. These may be defined in turn in some such way as follows:

I. Experimentation is used to discover the influence or effects of an educational factor applied in the school. It is usually the outgrowth of an hypothesis concerning something that has not been scientifically tried. The factor to be applied is determined by the research worker, and to a great extent the situation is controlled by him. The custom is to take two or more equivalent groups, give initial tests in the subject to be studied, apply the educational factor, then measure the results. This type of method of research requires great scientific exactness, and is one of those most needed in the educational field today.

II. Investigation is used to discover the effects or factors that are already being applied by teachers and school systems. The research worker does not determine the educational factor nor control the situation. He merely goes in and studies the results of what others have done. This method was used by Rice and Stone in their studies of the influence of the length of the recita-

tion period on efficiency in arithmetic. They both found that there was little relation between time and results. Odell used this method in his study of the correlation between percent of attendance and school marks, and percent of attendance and achievement age. Pearson used the investigative method when he found the correlation between brothers in the color of their eyes to be 0.52; the correlation in height between father and son, 0.30; and the correlation in height between brother and brother, 0.50.

III. A third method of research is that of tests and scales. Here the real research work lies in the development of standards and norms. After tests are standardized they become the tools of the experimenter, investigator, or compiler.

IV. The historical method is confined chiefly to the study of the policies of educational leaders, the educational theories and practices of various peoples, and the development of educational systems in different countries. This method is sometimes confused with the method of compilation, but should not be, for it is very different in its nature and purpose. The historical method usually covers a longer period of time, deals with cause and effect relationships, is broader in its scope, and is used primarily for the purpose of obtaining a permanent record.

V. Compilation is used in assembling facts and data with reference to programs, opinions, customs, tendencies, conditions, needs, and the like. This method is often employed by the expert in an effort to break away from custom and tradition and to bring about progress. He compiles a mass of data with reference to a point in question and presents it to the controlling body. Questionnaires are frequently made use of, local or general conditions are studied, and catalogues are searched. The use of college catalogues to determine the percent of colleges which require Latin, mathematics, or some other subject for the Bachelor's degree would be an example of this method. The survey of a city, county, or state to determine the conditions, needs, and standing of the same might also come under this head.

The traits and abilities necessary to a research worker have not been determined. One individual may be more successful with one method of research than with another. The administrator is likely probably to be more interested in investigation and compilation than he is in developing norms for tests and scales. The psychologist is more interested in experimentation than in studying the history of education in some particular country. He is interested in tests and scales, and much interested in investigation when applied to such a problem, for example, as finding the correlation between difficulty of words in a series of readers and the frequency of their occurrence. The philosopher probably finds the greatest interest in the use of the fourth and fifth methods. He gleans his interpretation and draws his conclusion from the present-day status of a question and from its origin and history.

One rather peculiar idea about research which has sprung up in this country is that only those who are specially endowed are capable of doing this kind of work. This is rather unfortunate for three reasons: (1) It is psychologically unsound, for it smacks too much of the old faculty psychology. (2) We have very crude methods, if any, of telling who these people are. (3) More serious still is the fact that such a conception may delay the day when our schools will be managed and taught by scientifically trained research workers.

Research workers in the so-called natural sciences begin their training in the laboratories in the high school. There and in the college they are taught to use delicate measures and scales, to watch the details, and to be exact

They become familiar with their field and learn the technique long before they come to do their advanced problems.

Men give very little attention to the technique of research in education until they begin work for one of the advanced degrees. Consequently they do not use the technique long enough for it to become a part of them. Many are annoyed by it, and never do any further research work after the completion of the requirements for the degree. It is greatly to be deplored that during their college and university training men do not have earlier and more frequent use of research methods.

Research naturally postpones the day of fossilization in the life of the teacher, and it is doubtful whether a man who is not capable of doing research in his subject is really capable of teaching it as it should be taught. Of course, all men are by no means equal in their research ability. Some may be able to use equally well all the methods referred to in this paper, but every school man should be able to use one or more. It is very unlikely that one is or ever will be master of his field if he does no research work at all. The particular type or method to be used should probably be determined by temperament, position, experience, interest, and one's major field.

ROBERT P. CARROLL

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How Do Pupils Remember Spellings?

Incidentally to teaching methods of instruction in spelling, in a course in methods at the Amanzimtoti Institute Normal School, Natal, South Africa, in August, 1917, the writer gave a questionnaire to 43 Zulus being trained as teachers. For comparison, the same questionnaire was given to 43 white pupils in grade VIII (Standard 6) at the Mansfield Road School, Durban, South Africa, in June, 1919. At Amanzimtoti all the first-year students, aged fifteen to twenty-one years, answered the questionnaire; of these twenty-eight were girls. At Mansfield Road, only boys answered. One whole class was taken and the better students, as judged by school marks, of second class were added to make the same number of cases as that at Amanzimtoti. The comparability of results will be evident when it is known that the Zulus go to normal school directly from the eighth grade; because they have to learn English in the upper grades, they are usually retarded two to three years as compared with white pupils of the same grades.

The questions and answers are as follows:

Question 1. List ten words that you have trouble in spelling correctly.

Amanzimtoti students were allowed to give both English and Zulu words. Those most commonly given in English were: *naartje* (South African name for tangerine); *circuit, principal,* words like *believe* and *receive* and *receipt,* and others like *born* and *borne.* In Zulu words with the less usual clicks, such as *ixebula, isigqoko,* were listed. Mansfield Road boys gave: *hygiene, science, crocodile, bicycle, cauliflower, convolvulus, corpuscles, accessories, dusker,* and *rhinoceros.* Words having silent letters, especially those other than *e,* and words in which sounds are slurred, made up nearly all the cases given.

Question 2. Which do you find better for learning a spelling: to see the word written or to hear it spelled aloud?

Of the forty-three Amanzimtoti students, forty preferred to see the word, two said it was better for them to hear the word spelled, and one did not answer. Mansfield Road boys were twenty-seven for seeing and only six for hearing. The marked preference for visual presentation had not, however, at the time been considered in the methods of teaching spelling in either white or black schools in South Africa.

Question 3. If you have learned the spelling of a word, do you remember it if you do not write it after learning it?

The negative form of the question was adopted in order to focus attention on the results when the pupil tried to remember a spelling without writing it, whether by remembering it as a visual image or by a set of vocal motions. Thirty-two out of the forty-two Amanzimoti students said that they needed to write the word to secure retention. Five of them did not find this necessary; three said that the situation varied from word to word; and two gave irrelevant answers. Of the forty-three Mansfield Road boys, twenty-five said that they needed to write the word to secure retention. Thirteen did not need this; five said that the situation varied.

Question 4. Which do you learn spellings best from seeing printed or written words?

The origin of this question is obviously from certain early experimental results by W. A. Lay, who claimed a great superiority for the written over the printed word as the means of teaching spelling. At Amanzimtoti, only thirteen found the written word the most advantageous source from which to learn; these were also the thirteen who came lowest in English subjects in their examinations for certificates the following December. Twenty preferred the printed word; four found written and printed words equally good; and four answers were irrelevant. At Mansfield Road, twenty-two preferred written words, twenty preferred printed words, and one answer was irrelevant.

The data given agree with the findings of the more recent workers on the pedagogy of spelling in this country. They offer, however, additional evidence, especially valuable because of the agreement between the Amanzimtoti pupils, Negroes who had learned English in school and the Mansfield Road pupils, white boys whose home language was English.

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The Negro Elementary School Teacher in West Virginia is the subject of a bulletin by Joseph S. Price in the West Virginia Collegiate Institute Series of Studies in Social Science. The data were gathered by means of a questionnaire during the summer of 1922. The tabulation of conclusions are based on about 300 replies from Negro elementary-school teachers in that state. The average age of such teachers is thirty-one years, about three-fourths of whom are women. Fifty percent of the teachers graduated from normal schools, and about one-half of the teachers have received all their training in that state. The average years of experience are approximately eight and one-half years, and the average salary is just above one thousand dollars. Other items of interest regarding distribution and the average situation are given.